DRAFT
ENVIRONMENTAL IMPACT STATEMENT

PANOCHE VALLEY SOLAR FACILITY
SAN BENITO COUNTY, CA

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US Fish & Wildlife Service

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Transmission Line Natural Resources Assessment Report

Panoche Valley Solar Project
San Benito County, California

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1.0 Introduction

Panoche Valley Solar, LLC (PVS) proposes to construct and operate an approximate 247 megawatts (MW) solar photovoltaic energy generating facility located in San Benito County, California (Figure 1). The project would be called the Panoche Valley Solar Project (Project); the Project Footprint (Project Area) is approximately 2,506 acres in the Panoche Valley of eastern San Benito County, California, and would also include approximately 23,292 acres of Conservation Lands that are contiguous with the Project Area in San Benito and Fresno counties (Figure 1).

Due to the construction of the Project, Pacific Gas and Electric (PG&E) proposes to install optical ground wire (OPGW) on its existing Panoche-Moss Landing 230 kilovolts (kV) transmission line to establish the primary telecommunication service between the substation at the Project Footprint and Panoche Substation located 17 miles to the east of the Project. Locations of temporary study areas and permanent features needed to connect the Project's switchyard into the Panoche-Moss Landing 230 kV transmission line are shown on Figure 2.

This installation process is a routine method of providing telecommunication services between electrical substations and generating facilities or other substations and is considered maintenance to existing electrical infrastructure. The OPGW lines can be installed on existing towers with minimal or no modification to the existing towers. The purpose of the OPGW is for system protection and control of the transmission line. The OPGW line to be installed is designed to replace traditional shield wire, which protects the line by providing a path to ground, by handling electrical faults like shield wire with the added benefit of containing optical fibers which can be used for telecommunications purposes. The work along the transmission line will be of short duration at any one site (two to three weeks) and the entire installation of OPGW is planned to be completed in approximately 12 to 16 weeks.

Based on feedback expressed by the County of San Benito to support preparation of a Supplement Environmental Impact report (EIR), the Project conducted a 100 percent coverage survey of planned areas of ground disturbance associated with proposed PG&E telecommunication upgrades. Areas of planned ground disturbance were surveyed to evaluate for sensitive species known to occur in San Benito and Fresno counties, cultural resources, and state and federal jurisdictional waters. The results of the cultural resources surveys are provided in a separate report.

This survey was conducted based on planned work areas provided by PG&E as of September 15, 2014, and this subsequent report is based upon work areas provided at that time. Based on discussions with PG&E since the time of this report, modifications have been made regarding the locations of certain work areas. These changes have not been addressed in this report, but will be documented in a supplemental memorandum of this report.

2.0 Study Areas

Work activities associated with PG&E telecommunications upgrades are mostly considered temporary and will be completed during daylight hours. It is planned that existing roads and helicopters will be used to provide access to work areas wherever possible. The proposed work areas anticipated to have temporary ground disturbance include 12 temporary wire pull sites, three temporary landing zones, eight temporary guard structures, and nine wood pole temporary work areas.

Included in the survey area is a 500 foot (ft) buffer around each planned area of ground disturbance. For work areas located within proximity to one another, where the 500-ft buffers of the disturbance points overlapped, the buffers were dissolved together rather than each disturbance point having a distinct and separate 500-ft buffer. Due to this method of combining overlapping buffer areas, rather than survey 34 individual work areas along the transmission line ROW, surveys were conducted on 13 larger survey areas along the ROW. These 13 larger areas are referred to as "study areas", each with an assigned number for the purposes of this report (Figure 2). Table 1 outlines the study areas as they were grouped in the survey and as they are discussed throughout the remainder of this report.

Table 1. Study Area Descriptions

Study Area	Study Area Description	Disturbance/Work Area Acreage (approx.)	Study Area Buffer Acreage (approx.)
Work Area 1	AT&T Cable Site	0.02	20
Work Area 2	Landing Zone 1	0.34	24
Work Area 3	Wire Pull Sites 1 and 2	0.26	40
Work Area 4	Wire Pull Sites 3, 4, and 5	0.26	56
Work Area 5	Wire Pull Sites 6 and 7	0.26	39
Work Area 6	Wire Pull Sites 8 and 9, ADSS Wood Pole 1	0.29	30
Work Area 7	ADSS Wood Poles 2-9, Guard Structures 1-3, Wire Pull Site 10 and 11	1.01	116
Work Area 8	Landing Zone 2	0.34	24
Work Area 9	Guard Structures 4 and 5	0.34	26
Work Area 10	Guard Structures 6 and 7	0.34	29
Work Area 11	Guard Structure 8	0.17	22
Work Area 12	Substation OPGW underground work area, Wire Pull Site 12	2.19	49
Work Area 13	Landing Zone 3	0.34	24

The purpose of surveying a 500-ft buffer (the buffer) around each area of planned disturbance is to provide flexibility for field teams to move proposed work areas if the original position is within an area with potential to disturb sensitive resources.

The habitats within the study areas and the vicinity are comprised of annual, non-native grasslands used mainly to graze livestock in the western study areas (Study Areas 1-3), while ephedra and Allscale saltbush scrub habitat dominated the central most study areas (Study Areas 4-6). The eastern portion of the transmission upgrade project area was noted to be disturbed due to the development of agricultural (e.g. almond orchard, vineyard) and transportation (Interstate 5 and public roadways) purposes (Study Areas 7-13). Additional details on the habitat at each study area is described in Section 4.0 below. The study areas experience a Mediterranean climate with dry hot summers and cool wet winters. However, this region does not experience heavy rainfall. Annual precipitation in the general vicinity of the study areas range from eight to ten inches per year. Approximately 85 percent of precipitation falls between October and March. Temperatures average approximately 80 degrees Fahrenheit (˚F) in the summer and 40˚F in the winter, mid-summer temperatures are often over 100˚F, and winter lows can be close to freezing. Nearly all precipitation infiltrates into the site's soils and flows in creeks and drainages when soil capacity has been reached.

2.1. AT&T Cable Site

AT&T will install new cable underground in the shoulder of Little Panoche Road from an existing connection point located 2,000 feet south of the Project Footprint to the site. The temporary work site will include the construction of a two feet wide by three feet deep trench to allow direct burial of the cable in compliance with state and local standards. The total area to be temporarily disturbed due to the AT&T cable installation for the project is approximately 0.02 acres. This acreage does not include the buffer area surveyed for the AT&T cable installation. The installed cables will then connect to a Network Interface Unit (NIU) measuring approximately 36 inches tall by 12 inches wide by 12 inches deep, which will be placed at the end of the cable trench line near the Project Footprint.

2.2. Wire Pull Sites

The 12 temporary wire pull sites established along the 17-mile transmission line corridor will require minor ground disturbance that should not result in permanent impact to sensitive natural and cultural resources within each necessary temporary wire pull site. Each proposed temporary wire pull site will require a work area of approximately 75-ft by 75-ft (0.13 acres) located mid-span of existing tower sites within the transmission right-of-way (ROW). The total area to be temporarily disturbed due to the wire pull sites for the project is approximately 1.42 acres. This acreage does not include the buffer area surveyed for potential wire pull sites for this project. Criteria used in selecting the final wire pull sites will include vehicle accessibility, presence of flat or nearly flat terrain adjacent to the existing transmission line route for equipment set-up, and an area that will avoid or minimize impacts to sensitive species or their habitats and other resources that would restrict work.

2.3. Landing Zones

Helicopters will be used to transport electrical workers to towers, deliver materials, and assist in pulling the OPGW from tower to tower. As presently planned, three 150-ft by 100-ft landing zones (0.34 acres) will be constructed approximately every five miles. The total area to be temporarily disturbed due to the landing sites is approximately 1.02 acres. This acreage does not include the buffer area surveyed for potential landing zones for this project. The criteria used for selecting the helicopter included an area of ground with the right topography to stage materials, pick up and transport electrical personnel and equipment, and refuel the helicopters. Establishment of these landing zones will require minimal ground disturbance and will facilitate the use of helicopters to reduce the overall impacts associated with the proposed work.

2.4. Guard Structures

Eight temporary guard structures will be necessary due to the installation of the telecommunication upgrades. The guard structures are designed to prevent tools or materials from falling into the roadway or utility, are required for overhead crossings of public roadways or existing utilities. Guard structures generally consist of two to four wooden poles and cross beams attached between the poles. They are typically installed in pairs with a net strung between them. The wooden poles will be augured and set by a line truck. Poles are anticipated to be placed in or adjacent to the disturbed road shoulder in an approximately 75-ft by 75-ft area (0.17 acres). The total area to be temporarily disturbed due to the guard structure installation sites is approximately 1.36 acres. This acreage does not include the buffer area surveyed for potential guard structure sites for this project. Installation of guard structures is not anticipated to require grading or vegetation removal, and guard structure poles will be removed following OPGW installation and the holes backfilled.

2.5. Wood Poles

Due to the existing 230 kV transmission line crossing under two existing 500 kV transmission lines, a section of approximately 4,650 feet of the 230kV will require installation of approximately nine new wood poles within the existing ROW. Within this 4,650 foot section, an All-Dielectric Self-Supporting (ADSS) fiber optic cable would be spliced from the 230 kV towers to the east and west sides of the 500 kV transmission line corridor and attached to the nine new wood poles. The poles will be located at a 30-ft to 40-ft offset to the existing 230 kV centerline and within the ROW. Installation of these poles will require a work area of 30-ft by 40-ft each (0.03 acres per pole installation site) to accommodate one crew truck and a trailer truck to transport each pole to the site, and a line truck to auger a hole about eight-feet deep and two-feet wide. The total area to be temporarily disturbed due to the wooden pole installation sites is approximately 0.27 acres. This acreage does not include the buffer area surveyed for potential wood pole sites for this project. Installation of the wooden poles is not anticipated to require grading or vegetation removal. However, the wooden poles themselves will remain in place as permanent structures but have a minimal overall impact footprint.

2.6. Optical Ground Wire Underground Installation

A section of approximately 75-ft by 1,200-ft (2.06 acres) will require for the installation of a section of OPGW underground within the existing ROW paralleling West Panoche Road, entering the eastern existing substation. This acreage does not include the buffer area surveyed for the potential OPGW underground installation site for this project. Installation of this underground section will require the above stated work area to accommodate the necessary equipment to either bore or trench the OPGW to the existing substation connection point. The total area to be temporarily disturbed due to the installation, however, the site will be restored to its original contours and elevations upon completion of the installation.

3.0 Transmission Line Assessment Methods

The following general methods for state and federal protected species surveys were used to inventory the study areas within the transmission line upgrade project area.

3.1. Sampling Location Selection

Locations for the necessary work areas were selected by PG&E based on topography, access and the constraints of splicing and pulling OPGW with a helicopter. Study areas were then created using a 500-ft buffer around each chosen work area.

3.2. Compile Existing Information

Prior to conducting the field assessments, existing information concerning sensitive species with potential to occur in the San Joaquin Valley was reviewed. Special status species with potential to occur are provided in Appendix A. Based on preliminary desktop review of potential sensitive species, surveyors evaluated each study area for indications/signs of the absence or presence of the following federally endangered, federally threatened, and/or California fully protected species or their habitats: longhorn fairy shrimp (*Branchinecta longiantenna*; LHFS), conservancy fairy shrimp (*Branchinecta conservation*; CFS), vernal pool fairy shrimp (*Branchinecta lynchi*; VPFS), vernal pool tadpole shrimp (*Lepidurus packardi*; VPTS), blunt-nosed leopard lizard (*Gambelia sila*; BNLL), California red-legged frog (*Rana draytonii*; CRF), California tiger salamander (*Ambystoma californiense*; CTS), golden eagle (*Aquila chrysaetos*; GOEA), white-tailed kite (*Elanus leucurus*; WTKI), California condor (*Gymnogyps californianus*; CACO), giant kangaroo rat (*Dipodomys ingens*; GKR), San Joaquin kit fox (*Vulpes macrotis mutica,* SJKF), San Benito evening-primrose (*Camissonia benetensis*), California jewel-flower (*Caulanthus californicus*), and San Joaquin woollythreads (*Monolopia congdonii*). In addition to these federally endangered, federally threatened, and/or California fully protected species, surveyors evaluated each study area for indications/signs of the absence or presence of other special status species or their habitats listed in Appendix A.

<u>Longhorn Fairy Shrimp</u>

The LHFS is currently listed as endangered under the Federal Endangered Species Act (ESA). Male LHFS are distinguished from other fairy shrimp by the second antennae, which is about twice as long, relative to its body size, as the second antennae from other species. Females are distinguished by their cylindrical brood pouch that extends below abdominal segments six and seven. Helm (1998) conducted a survey for fairy shrimp, during which LHFS were identified in alkaline pools and rock outcrop pools. Pools containing LHFS ranged from 4.6 to 2,788 m^2 with an average of 678 m^2. Pool depths ranged from 10 to 40 cm and averaged 23.1cm. Additionally, pools inhabiting LHFS generally had a near neutral pH, and temperatures ranging from 10 to 28°C. All pools with extant populations dry out during the summer and fall, which is required for the inundation cycle of LHFS to trigger hatching. The LHFS is very rare and only known from eight distinct populations in San Luis Opisbo, Merced, Contra Costa, and Alameda Counties (USFWS 2005).

Conservancy Fairy Shrimp

The CFS is currently listed as endangered under the ESA. The CFS is distinguished from other fairy shrimp by variations on the male's second antennae, which has a shorter distal segment than basal segment and is bent approximately 90°, and the female's brood pouch, which is tapered on each end and extends to the eighth abdominal segment (Eng et al. 1990). The CFS is generally off-white to gray with potential for green or yellow on the brood pouch. Suitable habitat for CFS includes vernal pools, alkaline pools, and vernal lakes (Helm 1998). The average pool size for CFS is 27,865 m^2, which is larger than all other endemic California brachiopods. Pools occupied by CFS commonly have low alkalinity, low total dissolved solids, a near neutral pH, and are dominated by native vernal pool plants (USFWS 2005). Similarly to the LHFS, CFS requires a dry period in the summer and fall for inundation to trigger hatching.

Vernal Pool Fairy Shrimp

The VPFS is currently listed as threatened under the ESA. The VPFS are distinguished from other fairy shrimp by the presence and size of several mounds on the male's second antennae and by the female's short, pyriform brood pouch. VPFS are typically a translucent off-white to grey and vary in size from 11 to 25 mm in length (Eng et al. 1990). Helm (1998) found VPFS in 21 different types of habitat, including vernal pools, vernal swales, alkaline pools, and road-side ditches. Optimal pools tend to be a neutral to slightly alkaline pH, have low dissolved salts, and are dominated by native vernal pool plants. Additionally, all pools must have a dry period in the summer and fall to enable the inundation cycle to trigger hatching.

Vernal Pool Tadpole Shrimp

The VPTS is currently listed as an endangered species under the ESA. The VPTS is identified by a large, shield-like carapace that covers the anterior half of the body. They have 30 to 35 pairs of phyllopods, a segmented abdomen, and paired cercopods or tail-like appendages. Mature VPTS range from 15 to 86 mm (USFWS 2005). VPTS are typically green, but coloration may vary from clear to tan, depending on water clarity (Yolo Natural Heritage Preserve 2009). Helm (1998) found VPTS in 17 different types of habitat, including alkaline pools, vernal pools, vernal swales, ditches, road ruts, and stock ponds. Average occupied pool size was 1,828 m^2, and occupied pool depth ranged from two to 151 cm, with an average of 15.2 cm. Optimal pools are neutral to slightly alkaline, clear, low in dissolved solids, and dominated by native vernal pool plants. Unlike other vernal pool crustaceans, VPTS eggs do not require a dry period before hatching, although they do require inundation.

Blunt-nosed Leopard Lizard

The BNLL are already known to occur in the Project's conservation lands and are currently listed as endangered under the ESA and by the California Endangered Species Act (CESA). BNLL are quite often the largest lizard throughout its range, and coloration can vary greatly. Background colors on the dorsal surface can range from yellowish, light gray or dark brown depending on the surrounding soil and vegetation. The ventral surface is uniformly white. The color pattern on the back consists of longitudinal rows of dark spots interrupted by white, cream, or yellow bands. These cross bands can aid in distinguishing the BNLL from other leopard lizards; the cross bands of the BNLL are much broader, more distinct, and extend from the lateral folds on each side of the body.

One common characteristic of most BNLL habitat is sparse vegetation, though vegetation does not preclude this species. BNLL rely mainly on speed to avoid predators and catch prey. A thick cover of herbaceous vegetation impedes BNLL movement, making them more vulnerable to predators and less likely to capture prey. In areas with thick herbaceous vegetation, BNLL will utilize barren washes and roads (Warrick et al. 1998). Adult BNLL emerge from below ground dormancy in early- to mid-April and remain active into July and August (Germano and Williams 2005, CDFG 2004). The BNLL is generally absent from areas of steep slopes and dense vegetation, and areas subject to seasonal flooding (USFWS 2010).

California Red-legged Frog

The CRF is currently listed as a threatened species under ESA. The CRF is a medium-sized frog with smooth skin, webbing on the hind feet, and ridges on the sides of the frog. The CRF is reddish-brown or brown, gray, or olive with small lack spots on the back and sides and dark banding on the legs. The hind legs and lower belly are red underneath, and the chest and throat are creamy and marbled with dark gray. Tadpoles are brown and marked with small dark spots, creamy white coloring with small specks on the lower body, and often rows of dorsolateral lights spots running back from behind the eyes (Nafis 2014).

The CRF is typically found in or near water in humid forests, woodlands, grasslands, coastal scrub, and streamside habitats, but do move overland at times and can be found in damp places far from water, including cool and moist bushes. Breeding habitat is in ephemeral water sources including lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. The CRF is typically found active all year except in wetlands that dry out in summer, where frogs will estivate in moist refuges until the late fall rains. Breeding occurs from late November to April, depending on the location (Nafis 2014).

California Tiger Salamander

The CTS is currently considered a threatened species under ESA and is a state threatened candidate under CESA. The CTS is characterized by a broad head, small eyes, and tubercles on the side of the feet. Coloration is a black back with yellow, cream, or white oval spots or bars. Some individuals may have a prominent cream band on the undersides. Snout-vent length ranges from 7.6 – 12.7 cm, and total length ranges from 15 – 22 cm (Stebbins 1966; 2003).

Ephemeral vernal pools, which refill with water on a yearly basis, that are 40 – 80 cm in depth and have a surface area of 0.2 hectares or more are optimal for breeding CTS; although small, shallower pools will also house breeding CTS (Stokes et al. 2008). Stokes et al. (2008) found no CTS larvae in pools with an average depth of less than 22 cm. There is a narrow range of pool depths where the pool will not completely dry out before CTS have metamorphosed, but also not contain water year round and house predators. Metamorphosed CTS move out of the vernal pools and into upland habitats. Small mammal burrows are important features of upland habitat. Adult CTS occupy small mammal burrows in grassland, savanna, or open woodland habitats (Trenham and Shaffer 2005). Adults can generally be found at breeding pools from October through May, although breeding is highly dependent on the amount of precipitation (Trenham et al. 2001; Trenham and Shaffer 2005). Adult CTS leave the breeding pools in late spring and return to upland habitats. CTS larvae were observed in two off-site ponds during CTS Protocol Larval Surveys during the 2009-2010 rainy seasons.

Golden Eagle

The GOEA is currently listed as a state fully protected species. The GOEA is one of the largest birds in North America with a wingspan of up to 220 cm. The GOEA has broad wings with a relatively small head and long tail. Adults are dark brown with a golden sheen on the back of the head and neck. For the first several years, juveniles have a defined white patch at the base of the tail and wings. The GOEA are generally found alone or in pairs, soaring with wings slightly lifted and wingtip feathers spread apart (Cornell Lab of Ornithology 2014).

The GOEA are known to inhabit partial or complete open country, particularly near mountains, hills, and cliffs. GOEA are known to use a variety of habitats including tundra, shrublands, grassland, coniferous forests, farmland, and along rivers and streams. The GOEA nest in trees and on cliffs and steep escarpments in grassland, chaparral, shrubland, forest, and other vegetated areas (Cornell Lab of Ornithology 2014).

White-tailed Kite

The WTKI is currently listed as a state fully protected species. The WTKI is a medium-sized raptor with a wingspan of up to 38 cm. The WTKI has long, narrow, pointed wings and a long white tail. The back and wings of the WTKI is gray, while the face and underside are white. A black spot can be seen on inner portion of wings. WTKI have red eyes as adults and yellow eyes as juveniles. Juveniles look similar otherwise but have buffy streaks on the breast and head, and gray with white-tipped feathers on the back (Cornell Lab of Ornithology 2014).

The WTKI is often found in savanna, open woodlands, marshes, desert grassland, partially cleared lands, and cultivated fields. Areas with extensive winter freezes are avoided, but rainfall and humidity vary greatly throughout the bird's range. Hunting is done over lightly grazed or ungrazed fields. The WTKI typically nests in the upper third of trees that may be 3-49 m tall. Nesting trees may be open-country trees in isolation or within a forest. Characteristic hunting behavior consists of the WTKI hovering in a stationary position up to 24 m off the ground before dropping straight down onto prey (Cornell Lab of Ornithology 2014).

California Condor

The CACO is currently considered a fully protected species, as well as a state and federally endangered species. With a wingspan of 2.8 meters and a broad, wedge-shaped tail, the CACO is the largest soaring bird in North America and one of the largest flying birds in the world. Adult birds are generally black, with mostly bald heads and necks. The bill is long, hooked at the end, and enveloped with flesh along the majority of its length. A feathered ruff is located at the base of the neck into which the neck and lower head can be withdrawn in order to warm the bird. White feathers of the underwing coverts and white tips on the upperwing coverts produce an elongated triangle on the leading half of the wing undersides and a white bar on the upperwing, respectively (Cornell Lab of Ornithology 2014).

The CACO is a habitat generalist, nesting in areas as diverse as chaparral and snow-covered montane forests. Nesting sites typically occur in cliff cavities, large rock outcrops, and large trees. Roosting sites are usually nearby (Snyder and Schmitt 2002, USFWS 1996). Both types of sites require isolation from human disturbance. The CACO locates its food by sight, not olfactory receptors, so open areas with little brush to conceal carrion are required. Cliffs and tall conifers, including dead snags, are generally utilized as roost sites. The closest known nests are located in the Pinnacles to the southwest of the project.

Giant Kangaroo Rat

GKR are already known to occur in the Project Footprint and Project's conservation lands and are currently listed as endangered under the ESA and by the CESA. The GKR is large relative to other rodents in the area, and has a brownish coloration with a light brown tail tip. The Panoche Region in western Fresno and eastern San Benito Counties is currently identified as one of the six major geographical units for remaining GKR populations (USFWS 1998).

GKR live in burrow systems referred to as precincts; a typical precinct has three burrows that are independent of one another and not interconnected (Williams and Kilburn 1991). The GKR is primarily a seed-eater, but occasionally consumes green plants and insects. Foraging takes place year round in all types of weather from around sunset to near sunrise, and most activity takes place within two hours of sunset. The ability to transport large quantities of seeds in cheek pouches, coupled with the highly developed seed curing and caching behaviors, probably allows GKR to endure prolonged droughts of one or two years without major regional population effects (Williams et al. 1993).

San Joaquin Kit Fox

SJKF are already known to occur in the Project Footprint and Project's conservation lands and are currently listed as endangered under the ESA and threatened by the CESA. The kit fox is the smallest canid species in North America, and the SJKF is the larger of the two subspecies. Kit foxes have a relatively small, slim body, large ears set close together, and a long, bushy tail tapering toward the tip. The tail is usually carried low and straight. The most common colorations are described as buff, tan, or yellowish-gray on the body. Two distinctive coats develop each year: a tan summer coat, and a silver-gray winter coat. The tail is distinctly black tipped.

Preferred habitat is often dependent on the density of kangaroo rats and lagomorphs, the two favored prey items of SJKF. SJKF occupy several dens throughout their home range during the year. Dens are usually modified ground squirrel, badger, or coyote dens and can be up to 2.3 m deep (Tannerfeldt et al. 2003).

San Benito Evening-primrose

The San Benito evening-primrose is currently considered threatened by the ESA and is included in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants on list 1B.1. The San Benito evening-primrose is an annual herb with peeling stems ranging from 3 to 20 cm long and wiry branches. Leaves are narrow and 7 to 20 mm long with small, sharp-toothed edges. Flowers contain four sepals that are approximately 3.3 mm long and four petals that are approximately 3.7 mm long. Petals are yellow and fade to reddish, and have two red dots at the base. Bloom period for the species is April to June. The San Benito evening-primrose is typically located in areas with soils that are slightly saline with a pH of 6 to 8.6 on serpentine alluvial terraces within the Clear Creek and San Carlos Creek drainages. It has been observed at elevations ranging from 630 to 1,410 meters above sea level, in areas with precipitation ranging from 43 to 63.5 cm (BLM 2010, Calflora 2014).

California Jewel-flower

The California jewel-flower is currently considered endangered by the ESA and CESA, and is included in the CNPS Inventory of Rare and Endangered Plants on list 1B.1. The California jewel-flower is an annual herb with basal and non-basal leaves. Basal leaves are wavy with a winged stem and are generally less than 11 cm long. Non-basal leaves are pear-shaped to round, with toothed edges. Flowers have 4 to 8 sepals ranging from 4 to 10 mm in length, and whitish petals with purple veins that are 6 to 11 mm long. Bloom period for the species is February to March. The California jewel-flower is generally located in flat, gently sloping areas in shadscale scrub, valley grassland, and pinyon-juniper woodland communities. It has been observed at elevations ranging from 68 to 975 meters above sea level (BLM 2010, Calflora 2014).

San Joaquin Woollythreads

The San Joaquin woollythreads is currently considered endangered by the ESA, and is included in the CNPS Inventory of Rare and Endangered Plants on list 1B.2. The San Joaquin woollythreads is a woolly annual herb. The San Joaquin woollythreads are generally 5 to 30 cm long with smooth, narrow leaves approximately 1 to 4.5 cm long with wavy edges. The ray flowers have 3-lobed yellow petals, and the disks of the flowers are 4-lobed, yellow, and bell-shaped. Blooming period for this species is February to May. The San Joaquin woollythreads are generally found in sandy or clayey grasslands. San Joaquin woollythreads have been observed at elevations ranging from 60 to 750 meters above sea level (BLM 2010, Calflora 2014).

3.3. Sensitive Species Assessment Methods

Field assessments used a transect sampling system whereby parallel transects spaced 30-meters (m) apart were evaluated by four biologists for the presence of sensitive species known to occur in the habitats found in the study areas in San Benito and Fresno counties. In addition to sensitive species, potentially jurisdictional state or federal waters were also evaluated within the study areas. Within each Study Area, surveyors visually inspected an area extending 15-m either side of each transect line. A fifth survey crew member surveyed each area for potential cultural resources.

<u>Longhorn Fairy Shrimp, Conservancy Fairy Shrimp, Vernal Pool Fairy Shrimp, and Vernal Pool Tadpole Shrimp</u>

Surveys for these vernal pool brachiopods are typically required to be conducted by surveyors permitted by the USFWS, and must be completed during the full wet season survey and full dry season survey (USFWS 1996). Though the transmission line survey was conducted outside the general vernal pool brachiopod survey protocol, the overall purpose of this survey for LHFS, CFS, VPFS, and VPTS was to assess potential habitat within each study area. Potential vernal pool brachiopod habitat was assessed based on topography, local hydrology, and geology. Transects were spaced 30-m apart and surveyors walked on adjacent transect lines, surveying 15-m on either side of their line and stopping occasionally to scan for activity

<u>Blunt-nosed leopard lizard</u>

In order to survey for BNLL consistent with CDFW guidelines, a minimum of two surveyors are required to slowly walk on parallel transects spaced no further than 30m apart, occasionally stopping to scan for BNLL using binoculars over 17 days between adult and hatchling periods from April to September. All biologists conducting this survey were Level II BNLL surveyors with greater than 100 survey days completed. Though this transmission line survey was conducted outside of the time period set forth in the BNLL survey protocol (CDFG 2004) and, at some points, outside of the weather constraints, the overall goal of this survey for BNLL was to assess potential habitat within each study area. Potential BNLL habitat was assessed based on topography/terrain, vegetation, and presence of suitable burrows. Transects were spaced 30-m apart and surveyors walked on adjacent transects lines, surveying 15-m on either side of their line and stopping occasionally to scan for activity.

<u>California Red-legged Frog</u>

The CRF survey methodology involves surveying for possible breeding pools and other potential habitat. Surveyors are required to be familiar with the vocalizations of the CRF. Protocol surveys must be completed between January and the end of September and generally consists of eight surveys, two day surveys and four night surveys during breeding season, and one day and one night survey during non-breeding season. The survey is conducted over a minimum period of six weeks (USFWS 2005). Although the transmission line survey was conducted outside the general CRF survey protocol, the overall purpose of this survey for CRF was to assess potential habitat within each study area. Potential CRF habitat was assessed based on local hydrology with particular attention paid to areas with potential to serve as breeding pools. Transects were spaced 30-m apart and surveyors walked on adjacent transect lines, surveying 15-m on either side of their line and stopping occasionally to scan for activity.

California Tiger Salamander

Surveying for CTS consists of inspecting transect lines for evidence of the small mammal burrows that could contain CTS and potential breeding pond habitat. Drift fence studies during the fall and winter are the primary method used to study CTS in upland habitats (USFWS 2003). Although the transmission line survey was conducted outside the general CTS survey protocol, the overall purpose of this survey for CTS was to assess potential habitat within each study area. Potential CTS habitat was assessed based on presence of small mammal burrows and local hydrology, with particular attention paid to areas with potential to serve as breeding pools. Surveying for CTS was conducted concurrently with other sensitive species discussed. Surveyors walked on parallel 30-m spaced transects inspecting the line and 15-m on both sides of the line, stopping occasionally to scan the area with binoculars. CTS are known to travel up to 1.2 miles from their breeding ponds to estivate; however, no survey for potential CTS breeding ponds was completed as part of this study.

Golden Eagle, White-tailed Kite, and California Condor

Surveying for the GOEA, WTKI, and CACO was conducted concurrently with the aforementioned sensitive species. Surveyors walked along 30-m spaced transects, occasionally stopping to scan the sky for the presence of the GOEA, WTKI, CACO, or other avian species. Evidence of nests or previous nesting was noted in study areas with cliffs, trees, or other substrate suitable for nests.

Giant Kangaroo Rat

Surveying methods for GKR consist of surveyors walking on parallel 30-m spaced transects inspecting each transect, including 15-m on either side, for evidence of GKR precincts. Burrow precincts were considered active based on presence of scat, tracks, tail-drags, pit caches, fresh excavations, and cropped vegetation around a series of suitably sized horizontal and vertical burrow openings. Precincts that did not appear to be occupied were also identified and mapped as inactive. Precincts were considered unoccupied when characteristic horizontal and vertical burrow openings and the surrounding area are devoid of all sign (fresh scat, tracks, fresh digging, and cropped vegetation).

San Joaquin Kit Fox

The San Joaquin kit fox survey methodology involves looking for dens and additional sign. The survey methodology used consisted of surveyors walking neighboring transects spaced 30-m apart to detect the dens that could be utilized by the species. Surveyors noted any known, natal, and potential kit fox dens, as well as latrines and tracks on loose earth observed within the work areas.

San Benito Evening-primrose , California Jewel-flower, and San Joaquin Woollythreads

Surveying for the San Benito Evening-primrose, California Jewel-flower, and San Joaquin Woollythreads was conducted concurrently with the aforementioned special status species. The survey methodology used consisted of surveyors walking neighboring parallel transects spaced 30-m apart, inspecting 15-m on either side of each transect for evidence of these plant species.

3.4. State and Federal Jurisdictional Waters Survey Methods

The following general methods for state and federal jurisdictional water surveys were used to inventory the study areas within the transmission line upgrade project area.

Clean Water Act

Potentially federal jurisdictional waters of the U.S., including wetlands, were assessed in the field for the transmission line and associated ground disturbance areas. Surveyors walked transects spaced 30-m apart, noting any topographic low with a defined bed and bank. During the on-site assessment, the sites were evaluated for drainage areas and potentially jurisdictional waters of the U.S. located within the proposed work areas and associated the larger study areas. The determination for jurisdictional waters of the U.S., including wetlands, was performed utilizing the Routine On-Site Determination Method as defined in the USACE Wetlands Delineation Manual (1987). This technique uses a three parameter approach, which requires positive evidence of:

- Hydrophytic vegetation
- Hydric soils
- Wetland hydrology

Areas exhibiting the above three wetland characteristics, as well as surface waters, are considered jurisdictional. Drainage features were also evaluated for the presence of continuous bed and bank and evidence of an ordinary high water mark (OHWM), in accordance with USACE Regulatory Guidance Letter No. 05-05, Ordinary High Water Mark Identification, and the Environmental Protection Agency (EPA) Draft Guidance on Identifying Waters Protected by the Clean Water Act (2011). Drainages with continuous evidence of bed and bank and an OHWM are typically considered jurisdictional.

The Project Area, including the transmission line and associated ground disturbance areas, is located within the Arid West Region. Soil samples were taken and Wetland Determination Data Forms (Arid West Region) were completed at any point with defined bed and bank and hydrophytic vegetation or an OHWM.

Other State Regulated Waters

Additional state regulated drainages were also assessed in the field. Notification is required for any alteration of a river, stream, or lake that flows at least intermittently through a bed or channel. Within each study area, for any drainage feature observed a Lake and Streambed Alteration Agreement (LSAA) Notification Drainage Survey Form was completed, including the presence of water, a defined bank, flow characteristics (ephemeral, intermittent, river, etc.), the presence of riparian habitat, and any additional notes. All forms were completed in accordance with the State of California Department of Fish and Game Code (Section 1602) requirements for notification. The Notification will be submitted only if alteration of a drainage feature is necessary.

4.0 Study Area Surveys Results

The survey was conducted from September 15 through September 18, 2014. Weather conditions were conducive to the survey and generally ranged from 75-100°F with winds of 5-15 mph. Based on field assessments, the majority of the planned sites for ground disturbance are areas in which there will be little to no disturbance of sensitive species, jurisdictional waters, or cultural resources. Photographs for each work area are presented in Appendix B.

4.1. Survey Results Study Area 1

Study Area 1, is a 2,000 linear foot disturbance planned along the shoulder of Little Panoche Road, consisting of the AT&T Cable Site that will be trenched for the installation of copper (Figure 3 and Table 1). Study Area 1 is located adjacent to the Project Area to the south within the Valley Floor Conservation Lands and is intersected by Little Panoche Road running north-south through the area (Appendix B and Figure 3). Trenching is planned along the Little Panoche Road shoulder; however, the habitat of the greater Study Area 1 (including the buffer) is considered disturbed (e.g. grazing) and is dominated by non-native and native species such as Russian thistle (*Salsola tragus*), red brome, procumbent pigweed (*Amaranthus blitoides*), bindweed (*Convolvulus arvensis*), Lamb's quarters (*Chenopodium album*), doveweed (*Croton setigerus*), Jimson weed (*Datura wrightii*), and redstem filaree. For a complete vegetation list please see Appendix B of this report.

No sensitive resources were observed within the disturbance area planned for trenching and communications wire/fiber installation, although evidence of use by sensitive species was observed within other portions of the associated buffer. An active GKR precinct was observed near the western edge of Study Area 1 and a fresh badger dig was observed near the southern edge of the study area, though no badger scat was noted near the dig (Figure 3). No federal or state regulated waters were observed in Study Area 1. As depicted in Figure 3, Study Area 1 overlaps with an existing proposed Project BNLL buffer zone. Work on the AT&T Cable Site will be conducted strictly along the shoulder of Little Panoche Road to avoid burrows potentially inhabited by BNLL or other sensitive species known to occur in the project area.

Despite no sensitive species being observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.2. Survey Results Study Area 2

Study Area 2 is an approximate 24 acre area within the Valley Floor Conservation Lands that includes Landing Zone 1 (Figure 4 and Table 1). Study Area 2 will be used for staging materials, picking up and transporting electrical personnel and equipment, and refueling helicopters. The habitat of Study Area 2 is considered disturbed due to heavy livestock grazing and is dominated by non-native grasses with some spares saltbush scrub habitat present (Appendix B). Some of the primary vegetative species observed in this area include soft chess (*Bromus hordeaceus*), Allscale saltbush (*Atriplex polycarpa*), vinegar weed (*Trichostema lanceolatum*), tumbling orach (*Atriplex rosea*), Russian thistle, prostrate spurge (*Chamaesyce ocellata ssp. ocellata*), common fiddleneck (*Amsinckia intermedia*), and shiny peppergrass (*Lepidium nitidum*). A complete list of observed vegetative species is provided in Appendix B.

Sensitive resources were minimal within Study Area 2 (Figure 4). No sensitive resources were observed within the 0.34 acre disturbance area, and only one recent badger dig was observed on the northern edge of the buffered study area. No federal or state regulated waters were observed in Study Area 2.

Based on discussions with PG&E since the completion of this survey, Landing Zone 1 located within Study Area 2 will be relocated due to its overlap with an existing proposed Project BNLL buffer zone (Figure 4). The new location of Landing Zone 1 will be determined later by PG&E.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.3. Survey Results Study Area 3

Study Area 3 (including the associated buffer) is approximately 40 acres and is located partially within the Valley Floor Conservation Lands and includes Wire Pull Sites 1 and 2 (Figure 4 and Table 1). Study Area 3 will be used for two temporary wire pull/splice sites, one staged on either side of the existing transmission tower. The habitat of Study Area 3 is similar to Study Area 2, as the areas are within 0.4 miles of each other. The study area is characterized by livestock grazed, non-native grasses with some sparse saltbush scrub habitat in the outer limits of the study area (Appendix B). Some of the most common species observed include red brome, redstem filaree, vinegar weed, angle-stem wild buckwheat (*Eriogonum angulosum*), tumbling orach, prostrate spurge, shiny peppergrass and Allscale saltbush. A complete list of vegetative species observed is located in Appendix B.

Study Area 3 had evidence of BUOW, GKR, SJKF, and SJAS (Figure 4). BUOW white wash was observed at several fence posts and pellets were noted at one post in the eastern portion of the study area. Inactive and active GKR precincts were observed throughout the southern portion of the study area. A SJKF latrine with old scat was observed in the eastern portion of the work area, and a SJAS was observed in the northern portion of the work area. Though evidence of several species was noted at Study Area 3, none of the observations were within the planned 75-ft by 75-ft area of temporary disturbance (Figure 4). Additionally, a small drainage was noted near the southeastern boundary of Study Area 3 which is potentially Other State Waters and may require permitting if planned locations for disturbance areas are modified.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.4. Survey Results Study Area 4

Study Area 4 is located in the hills 5.5 miles east of the Project Footprint within the Bureau of Land Management (BLM) Lands and consists of approximate 56 acres which includes the associated buffer (Figure 5). Study Area 4 includes Wire Pull Sites 3, 4, and 5 (Table 1), though final design of Wire Pull sites will only utilize two of the three locations. After the initial survey of Study Area 4 found the area to have highly variable topography and potential rare plant species, the survey was extended westward to determine if working around an alternative existing transmission tower would serve as a viable option for a wire pull/splice site. Study Area 4 will be used for two temporary wire pull/splice sites, one staged on either side of an existing transmission tower. Study Area 4 is located in rolling hills, dominated by non-native grasses and a natural scrub community (Appendix B). Some of the most common vegetative species observed in this area include Mediterranean grass (*Schismus arabicus*), vinegar weed, red brome, interior goldenbush (*Ericameria linearifolia*), California ephedra (*Ephedra californicus*), California matchweed (*Guitierrezia californica*), shiny peppergrass, and common fiddleneck. A complete list of vegetation observed is found in Appendix B.

Sensitive resource observations at Study Area 4 included inactive GKR precincts, a badger burrow, an SJKF latrine, and potential rare plant occurrences (Figure 5). All observations were made within the study area buffer but outside the 0.13 acre disturbance areas planned for potential wire pull sites. The sensitive species observations were generally located along the southern portion of the study area (Figure 5). GKR precincts observed were considered inactive due to the presence of bleached scat and hardened backfilled vertical burrows and lack of fresh sign. The badger burrow noted in this study area was in good condition but no recent sign was observed in the vicinity of the burrow. Sensitive vegetative species were particularly difficult to identify to the species level during the survey, due to the time of year and lack of flowers present; however, the potential rare plant observed is from the genus *Navarretia*, which includes 56 different species, 22 of which are considered rare in the State of California. All observations made at Study Area 4 were within the southern portion of the study area buffer, outside of the planned 75-ft by 75-ft ground disturbance areas. While sensitive resources do not inhibit this location as a wire pull site, the topography may serve as a limiting factor. No federal or state regulated waters were observed in Study Area 4.

While sensitive species were not observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.5. Survey Results Study Area 5

Study Area 5 is an approximate 39-acre portion of land (including the buffer) located within BLM lands approximately 10 miles east of the Project Footprint (Figure 6) which includes Wire Pull Sites 6 and 7 (Table 1). Study Area 5 will be used for two temporary wire pull/splice sites, one staged on either side of the existing transmission tower. Study Area 5 is located within the Allscale scrub alliance and appears to be occasionally used recreationally by all-terrain vehicles (ATV) (Appendix B). Some of the primary vegetative species observed in Study Area 5 include Allscale saltbush, tumbling orach, tocalote (*Centaurea melitensis*), common fiddleneck, prostrate spurge, angle-stem buckwheat, California buckwheat (*Eriogonum fasciculatum*), and redstem filaree. A complete list of observed vegetative species is found in Appendix B.

No evidence of sensitive resources were observed within the 0.13 acre planned disturbance area of Study Area 5, though evidence of use by the SJKF was observed in larger study area (Figure 6). A known SJKF den was observed in the southwestern portion of the study area where bones and prey remains were noted, in addition to somewhat fresh scat observed in the northeastern portion of the study area. Additionally, three drainages were noted along the northern boundary of Study Area 5 which are potential Other State Waters and may require permitting if planned locations for disturbance areas are modified.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.6. Survey Results Study Area 6

Study Area 6 is comprised of Wire Pull Sites 8 and 9 and ADSS Wood Pole Site 1 (Figure _ and Table 1). Study Area 6 is an approximately 30 acre area (including the 500-ft buffer) located approximately 12 miles east of the Project Area (Figure 7). The separation of Study Area 6 from Study Area 7 was a decision made in the field based on access and overall habitat differentiation between the two study areas. Study Area 6 is located within a more diverse habitat that includes steep slopes with loose sediment, Allscale scrub alliance, and a large wash with high ATV use (Appendix B). Some of the primary vegetative species observed at Study Area 6 include alkali goldenbush (*Isocoma acradenia* var. *bracteosa*), California matchweed, Russian thistle, wirelettuce (*Stephanomeria pauciflora*), allscale saltbush, saltcedar (*Tamarix ramosissima*), alkali heliotrope (*Heliotropium curassavicum* var. *osculatum*), and California buckwheat. A complete list of vegetative species observed is located in Appendix B.

Sensitive biological resources were not noted within Study Area 6 during the surveys; however, the northwestern portion of the buffered study area extends into Panoche Creek, a federally jurisdictional water feature (Figure 7). The creek was dry at the time of the site visit, but exhibited evidence of wetland hydrology and hydrophytic vegetation. Wetland hydrology primary indicators observed include drift deposits, surface soil cracks, and salt crust. Hydrophytic vegetation included saltgrass (*Distichlis spicata*), annual beard grass (*Polypogon monspeliensis*), and saltcedar. Wetland Determination Data Forms for this area are found in Appendix C.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.7. Survey Results Study Area 7

Study Area 7 consists of ADSS Wood Pole Sites 2-9, Guard Structures 1-3, and Wire Pull Sites 10 and 11 (Figure 7 and Table 1). Study Area 7, including the buffer, extends southeast-northwest for approximately 1 mile, comprising approximately 116 acres located 1.25 miles west of Interstate 5 (Figure 7). Study Area 7 will be used for several tasks necessary for the transmission line upgrade. Uses within this study area include: two temporary wire pull/splice sites, one staged on either side of the existing transmission tower; three guard structure sites where wood poles will be augered with net strung between them to catch any falling tools or other materials that could fall into the intersected public roadway; and eight ADSS wood pole sites where line trucks will auger holes eight feet deep and two feet wide for the wood poles. This study area is located almost entirely within a mixture of well-maintained pomegranate orchards and vineyards that had no herbaceous layer (Appendix B). Surveying methodology varied due to the high farming activity occurring throughout the week of surveys. Rather than survey 30-m transects within the vineyard and orchard that comprise Study Area 7, surveyors drove the primary roads of the vineyard and orchard at approximately 2 mph and inspected for burrow complexes and plant species between crop rows. When potential evidence of activity was observed surveyors walked the row to inspect the observation. No sensitive resources were noted within this study area (Figure 7). Panoche Creek, a federally jurisdictional water feature, intersects the northwestern boundary of the study area. The presence of Panoche Creek along the study area boundary may limit the movement of these various work areas.

Despite no sensitive species being observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.8. Survey Results Work Area 8

Study Area 8 is an approximate 24 acre area approximately one mile west of Interstate 5 (Figure 8) that includes Landing Zone 2 (Table 1). Study Area 8 will be used for staging materials, picking up and transporting electrical personnel and equipment, and refueling helicopters. Study Area 8 is located directly adjacent to Study Area 7 to the north. The southern portion of the study area is located within disturbed land developed with vineyards, while the northern portion is situated partially within the federally jurisdictional Panoche Creek and partially within a disturbed cleared work area used by the farmers to store equipment (Appendix B). Vegetative species at this work area were observed within Panoche Creek, due to the complete clearing of the northeastern portion of the area and the strict maintenance of the vineyards in the south. Some of the species observed within Panoche Creek include tree tobacco (*Nicotiana glauca*), saltcedar, big saltbush (*Atriplex lentiformis*), common sow thistle (*Sonchus oleraceus*), prostrate spurge, Jimson weed, procumbent pigweed, and alkali goldenbush. A full list of vegetation observed is located in Appendix B.

No evidence of sensitive species was observed within the 0.34 acre planned disturbance areas of Study Area 8, though evidence of use by the American badger was observed in the larger study area (Figure 8). American badger burrows were observed in the west-northwestern portion of

Study Area 8 within Panoche Creek. The presence of the federally jurisdictional Panoche Creek directly west/northwest of the planned disturbance area limits movement of this landing zone.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.9. Survey Results Study Area 9

Study Area 9 is an approximate 26-acre area located approximately 0.5 miles west of Interstate 5 (Figure 8) that includes Guard Structures 4 and 5 (Table 1). Study Area 9 will be used for guard structure sites where wood poles will be augered with net strung between them to catch any falling tools or other materials. Study Area 9 is located entirely within an almond orchard, with West Panoche Road intersecting the northern portion of the study area running roughly southwest-northeast (Appendix B). Some of the vegetative species observed at this study area include procumbent pigweed, prostrate spurge, redstem filaree, cheeseweed (*Malva parviflora*), bindweed, common fiddleneck, Lamb's quarter, and red brome.

No sensitive resources were observed within the planned 0.17 acre areas of disturbance for guard structures. The only noteworthy observation made in Study Area 9 is the sighting of a great horned owl (*Bubo virginianus*) which was flushed during the survey of the southeastern portion of the study area (Figure 8). No nest was observed in the area. No federal or state regulated waters were observed in Study Area 9.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.10. Survey Results Study Area 10

Study Area 10 is comprised of Guard Structures 6 and 7 (Table 1), an area comprised of approximately 29 acres that spans Interstate 5 (Figure 9). Study Area 10 will be used for guard structure sites where wood poles will be augered with net strung between them to catch any falling tools or other materials. Study Area 10 is within a disturbed habitat (e.g. plowing), bisected by I-5 running roughly north-south and intersected by West Panoche Road running roughly southwest-northeast (Appendix B). Due to the location of this study area relative to these two roads, Study Area 10 was essentially split into quarters for the survey (SE, NE, SW, NW). Some of the primary ruderal vegetative species observed include red gum (*Eucalyptus camaldulensis*), tree tobacco, puncture vine (*Tribulus terrestris*), procumbent pigweed, alkali goldenbush, Russian thistle, common fiddleneck, redstem filaree, bindweed, and saltgrass. A complete list of vegetation observed is located in Appendix B.

No sensitive resources were observed within the 0.17 acre areas of planned disturbance. The only sensitive species noted within Study Area 10 were two dead juvenile Swainson's hawks, a state-threatened species, that were observed adjacent to the highway in the northwest quarter of the study area (Figure 9). The hawks are assumed to have been killed by traffic along I-5 based on the proximity of both to the highway and apparent results of impact, which included the detachment of one of the hawk's wings from the remainder of the carcass. The northwest quarter of Study Area 10 has substantial cover of red gum, particularly when compared to the rest of Study Area 10, but no nests were observed in the study area. No federal or state regulated waters were observed in Study Area 10.

In addition to observations of Swainson's Hawks in the study area, habitat for several other potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.11. Survey Results Study Area 11

Study Area 11 is an approximate 22 acre area located approximately 1 mile east of Interstate 5 (Figure 10) that includes Guard Structure 8 (Table 1). Study Area 11 will be used for guard structure sites where wood poles will be augered with net strung between them to catch any falling tools or other materials. Study Area 11 is intersected by West Panoche Road running roughly southwest-northeast and by Brannan Avenue running north-south through the center of the study area. The southern portion of Study Area 11 is situated within a vineyard, while the northern portion is split between an almond orchard in the northwest and a cleared dirt field used for recreational purposes in the northeast (Appendix B). Vegetative species observed at Study Area 11 include procumbent pigweed, Lamb's quarter, prostrate spurge, redstem filaree, alkali weed, Jimson weed, Russian thistle, and unicorn plant (*Proboscideae lutea*). No sensitive resources including protected species and federal and state waters were observed within Study Area 11. No federal or state regulated waters were observed in Study Area 11.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.12. Survey Results Work Area 12

Study Area 12 is approximately 49 acres located approximately two miles east of Interstate 5 (Figure 11) and includes Substation OPGW Underground Work Area and Wire Pull Site 12 (Table 1). Study Area 12, including the buffer, stretches roughly east-west for approximately 0.4 miles and is intersected by West Panoche Road running roughly southwest-northeast through the central portion of the study area. This study area is considered disturbed due to the southern half of this study area being comprised of vineyards in the west and the Panoche Substation in the east, while the northern half of this study area is situated within an almond orchard (Appendix B). Additionally, in the central portion of the northern half of the study area directly adjacent to West Panoche Road, are three historic households and a newer farming structure (see Appendix D for cultural resources details). Primary vegetative species observed at Study Area 12 include prostrate spurge, prickly lettuce (*Lactuca serriola*), redstem filaree, bindweed, nightshade (*Solanum xanti*), doveweed, common fiddleneck, and cheeseweed. A full list of vegetative species observed is found in Appendix B.

No sensitive resources were observed within the 2.19 acre area of planned disturbance within Study Area 12. Potential SJKF tracks were noted within the northeastern portion of the work area buffer. Additionally, a great horned owl was flushed from the almond orchard while conducting the survey on Study Area 12 (Figure 11). No nest was observed. No federal or state regulated waters were observed in Study Area 12.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

4.13. Survey Results Study Area 13

Study Area 13 is an approximately 24 acre area located directly adjacent to the Panoche Substation approximately 2.5 miles east of Interstate 5 (Figure 11) that includes Landing Zone 3 (Table 1). Study Area 13 will be used for staging materials, picking up and transporting electrical personnel and equipment, and refueling helicopters. Study Area 13 is within a disturbed habitat with the northern portion intersected by West Panoche Road, the southwest within the Panoche Substation, and the east within a vineyard (Appendix B). Some of the primary vegetative species observed in Study Area 13 include California brome (*Bromus carinatus*), Russian thistle, procumbent pigweed, bindweed, tumbling orach, prostrate spurge, prickly lettuce, redstem filaree, vinegar weed, and cheeseweed. A full list of vegetation observed is located in Appendix B. No sensitive resources including protected species and federal and state waters were observed within Study Area 13.

Although no sensitive species were observed during the survey, habitat for several potential species was noted within the study area. Special status species with habitat within the study area can be found in Appendix A.

5.0 Summary and Recommendations

The most biologically diverse of the areas surveyed is Study Area 3 (Wire Pull Sites 1 and 2). Within Study Area 3, evidence of BUOW, GKR, SJAS, and SJKF was observed; however, none of these observations were made within the planned areas of disturbance for the wire pull sites. Access issues may restrict use of Study Area 5 (Wire Pull Sites 6 and 7), as the only access road is controlled by the BLM. Coordination with BLM may enable use of the two-track road that leads directly to Study Area 5. Variable topography may restrict use of Study Area 4 (Wire Pull Sites 3, 4, and 5).

Though observations for sensitive resources were relatively low at each study area surveyed, the majority of the study areas (excluding those within vineyards and orchards) contained substantial burrows for other rodents and small mammals, the primary source of food for the SJKF. Additionally, minimal amounts of old SJKF scat were observed at several study areas, specifically those to the west of Interstate 5. Even though no individual BNLL were observed, due to the terrain, evidence of sufficient small mammal burrows, the studies being performed outside the protocol season window, and the overall habitat within certain study areas, BNLL could potentially be found within work areas. With the noted evidence of the small mammal burrows the study areas could contain other special status small mammal species (e.g. Tulare grasshopper mouse). The study area was not trapped for these burrowing mammal species, therefore, without additional surveys, it has to be assumed that these special status species could utilize the small mammal burrows within the study areas.

Furthermore, with the evidence of the small mammal burrows the study areas could contain CTS. The study area was limited to a 500 foot buffer in which no vernal pools/ponds were located. However, with CTS known to travel up to 1.2 miles from their breeding ponds to estivate, no survey for potential CTS breeding ponds was completed as part of this study. Therefore, without a larger radius breeding pond survey, it has to be assumed that CTS could estivate within the appropriate sized small mammal burrows within the study areas.

No evidence of nesting special status raptor species were located within the study areas with exception of Study Area 3 as noted above. However, during the worked being performed during the upgrade that is within a quarter mile of an active nest during breeding season could cause a disturbance.

There are several special-status plants known to occur in the vicinity of the study areas. However, due to the timing of the surveys within the study areas certain special status species may not be evident. The potential presence of those special status species within the study areas due to habitat is noted in Appendix A. Use of any of the planned disturbance areas should take proper steps to ensure no sensitive species are impacted by the planned activities.

The potential habitats for some special status species were observed within certain study areas during the field assessment as noted in Appendix A. This does not provide evidence of presence or absence of the species but does give an indication of the potential for the species that could occur or be observed within the study areas during the appropriate seasonal survey window. This data will provide crucial information when developing the avoidance and minimization measures for the construction of the telecommunication upgrades.

Potentially federal and state jurisdictional waters were assessed in the field for the study areas and associated ground disturbance areas. The only study areas that were found to have jurisdictional waters issues was Study Area 6 and Study Area 8, both of which have disturbance area buffers extending into Panoche Creek. However, these potential jurisdictional areas are not located within the smaller associated disturbance area planned within the noted study area.

The results from the Panoche Valley Solar Transmission Line Natural Resources Assessment indicate the sites chosen as temporary work areas for transmission line upgrades are situated such that temporary disturbances will have potentially minimal or no impact on special status species and regulated natural resources described in this report with appropriate avoidance and minimization measures. Additionally, surveys of study areas, which included the planned disturbance areas and a 500-ft buffer, revealed the flexibility of moving the disturbance areas if necessary at the time of upgrade construction field work.

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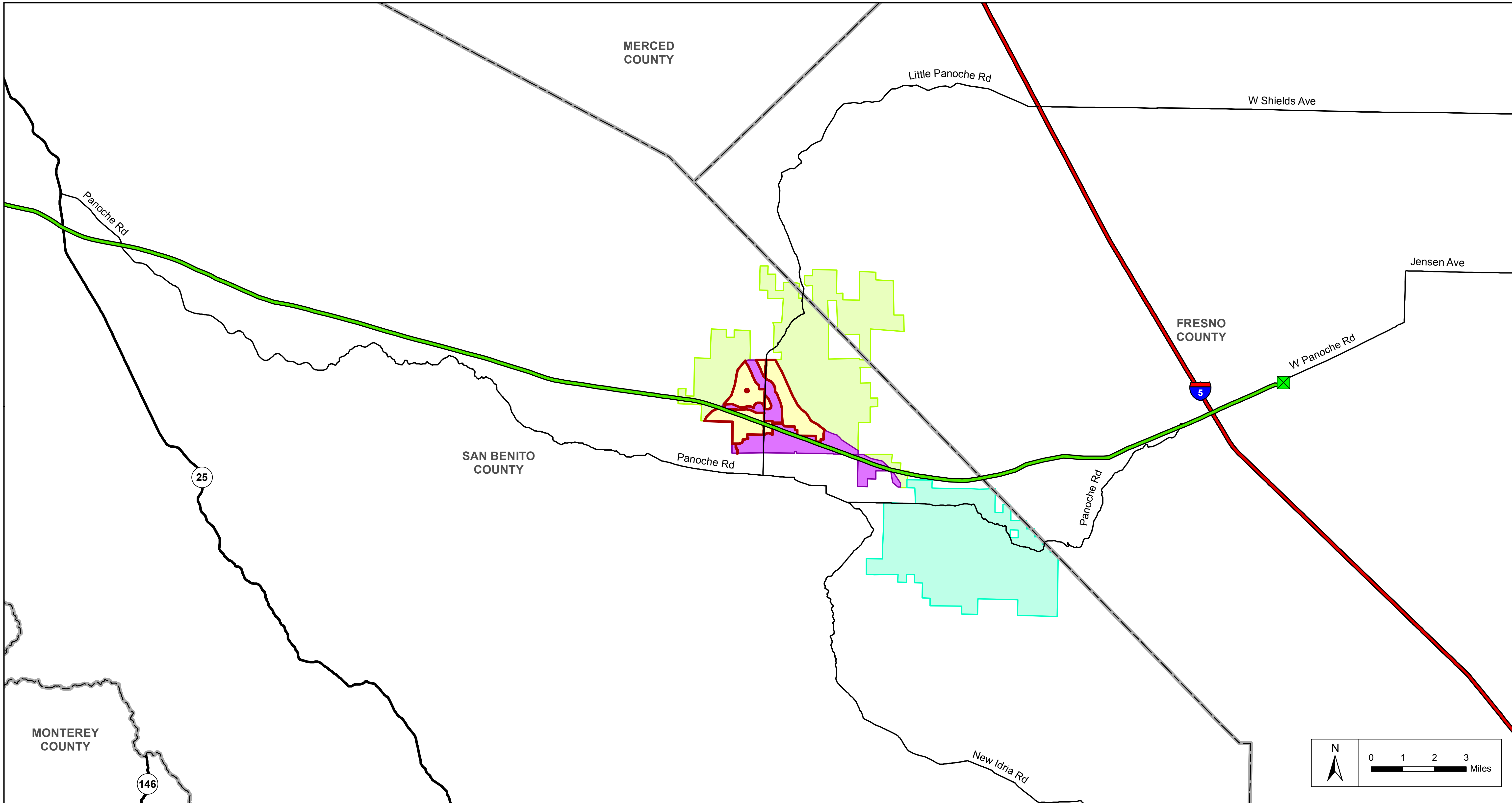
FIGURES



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Legend

- Project Footprint
- Silver Creek Ranch Conservation Lands
- Valadeao Ranch Conservation Lands
- Valley Floor Conservation Lands
- County Boundary
- Panoche Substation
- Electric Transmission

Panoche Valley Solar Project

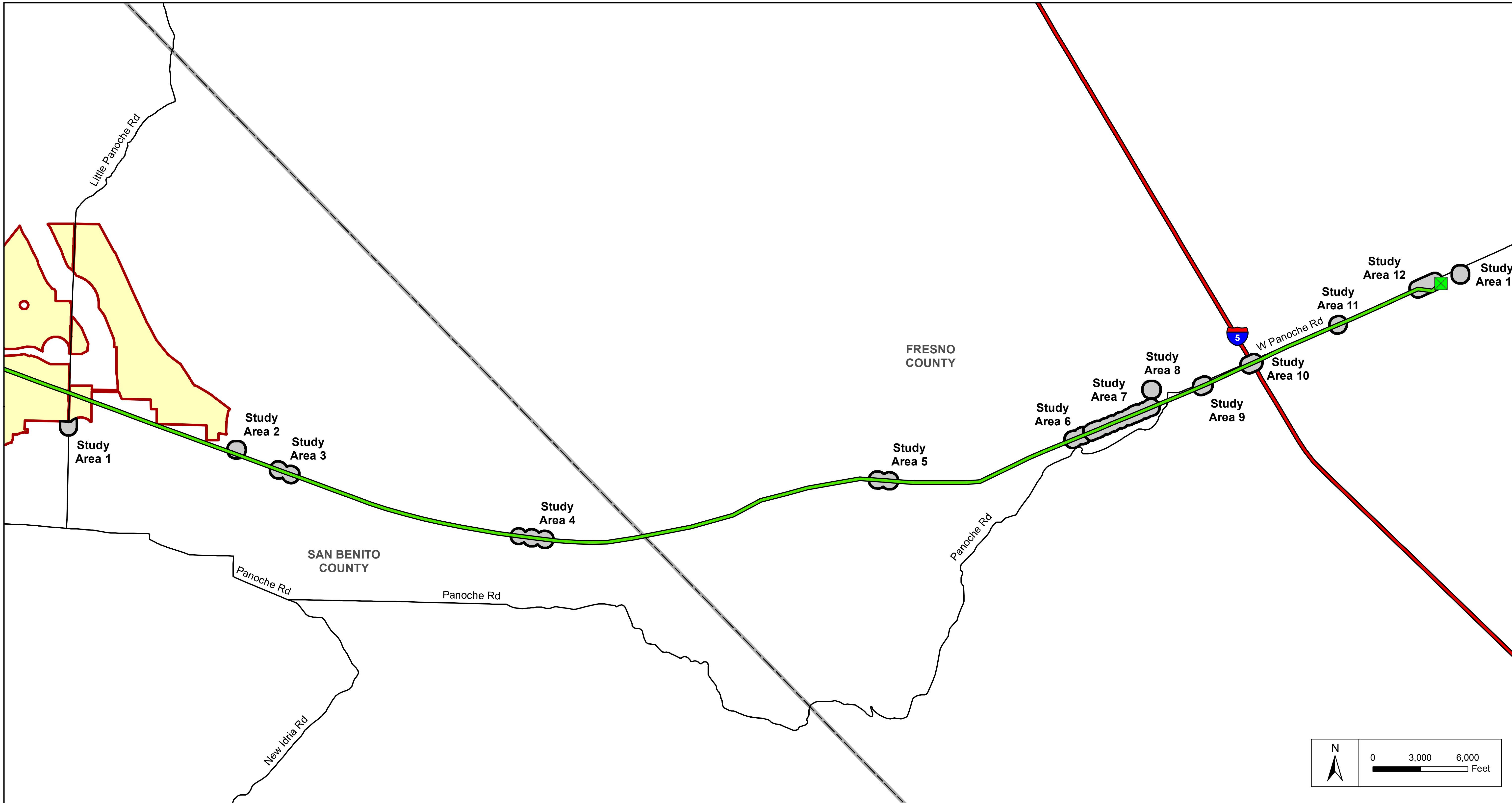
Telecom Upgrades

Regional Overview

FIGURE

1

JH 2014-09-29



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Legend

- Project Footprint
- County Boundary
- Panoche Substation
- Electric Transmission
- Study Area

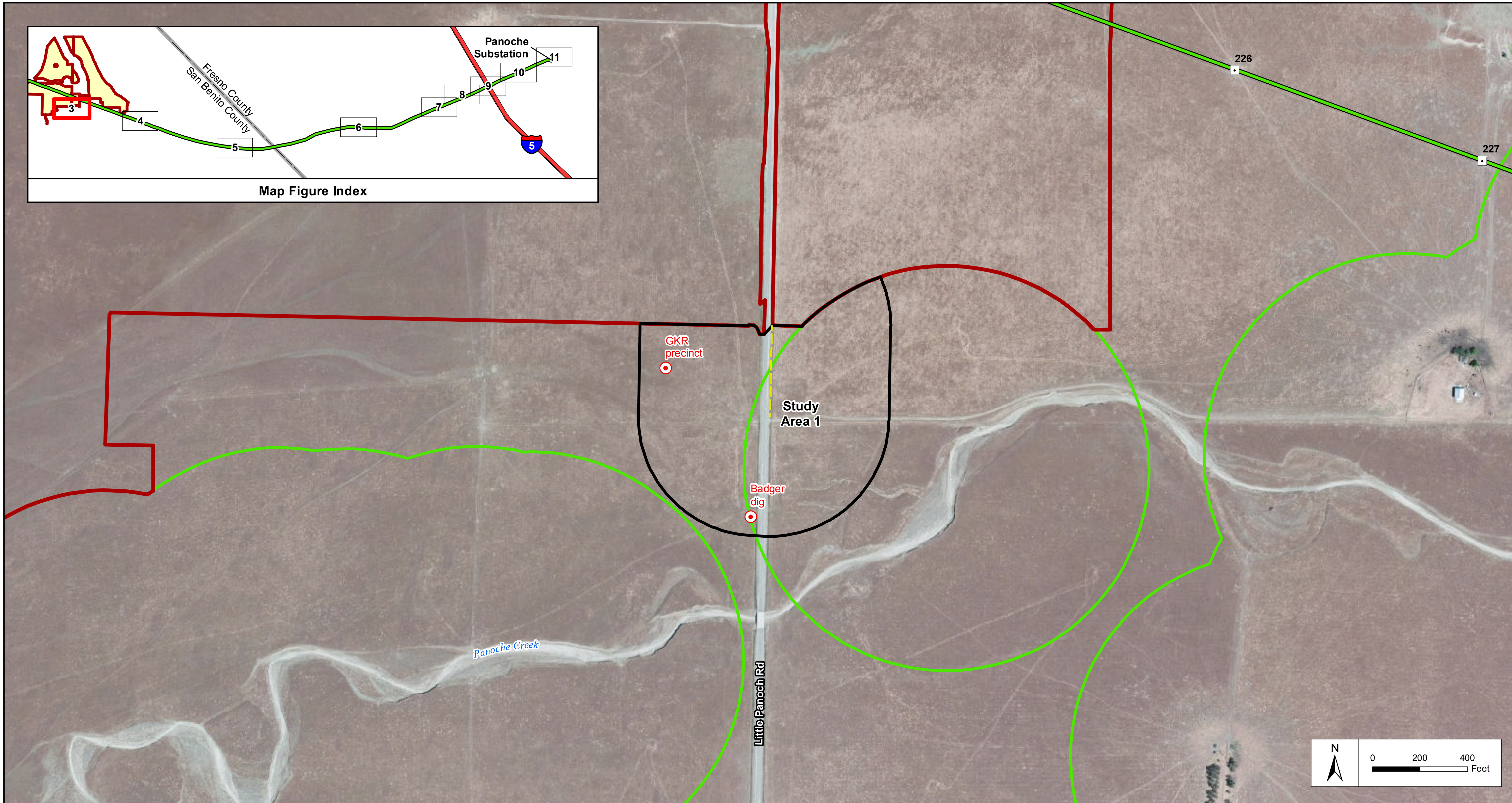
Panoche Valley Solar Project

Telecom Upgrades

Project Overview

FIGURE 2

JH 2014-09-29



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Legend

Survey Observation	Existing Transmission Structure
Study Area	Existing Electric Transmission
Solar Project	AT&T Cable Below Ground Option
	Blunt-Nose Leopard Lizard Buffer Area

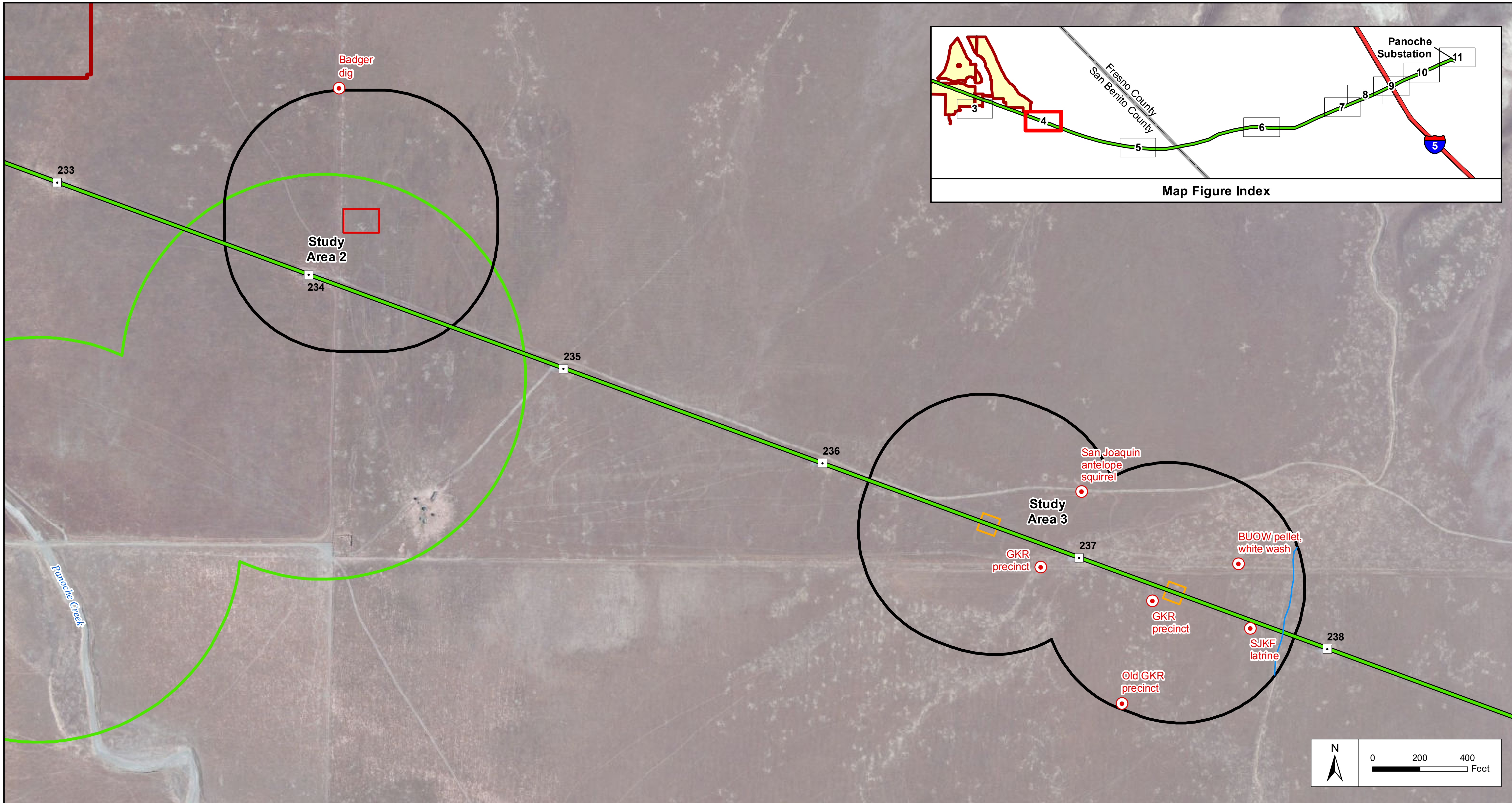
Panoche Valley Solar Project

Telecom Upgrades

Study Area 1

FIGURE 3

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Solar Project
- Existing Transmission Structure
- Existing Electric Transmission
- Drainage
- Landing Zone Work Area
- Wire Pull Site Work Area
- Blunt-Nose Leopard Lizard Buffer Area

Panoche Valley Solar Project

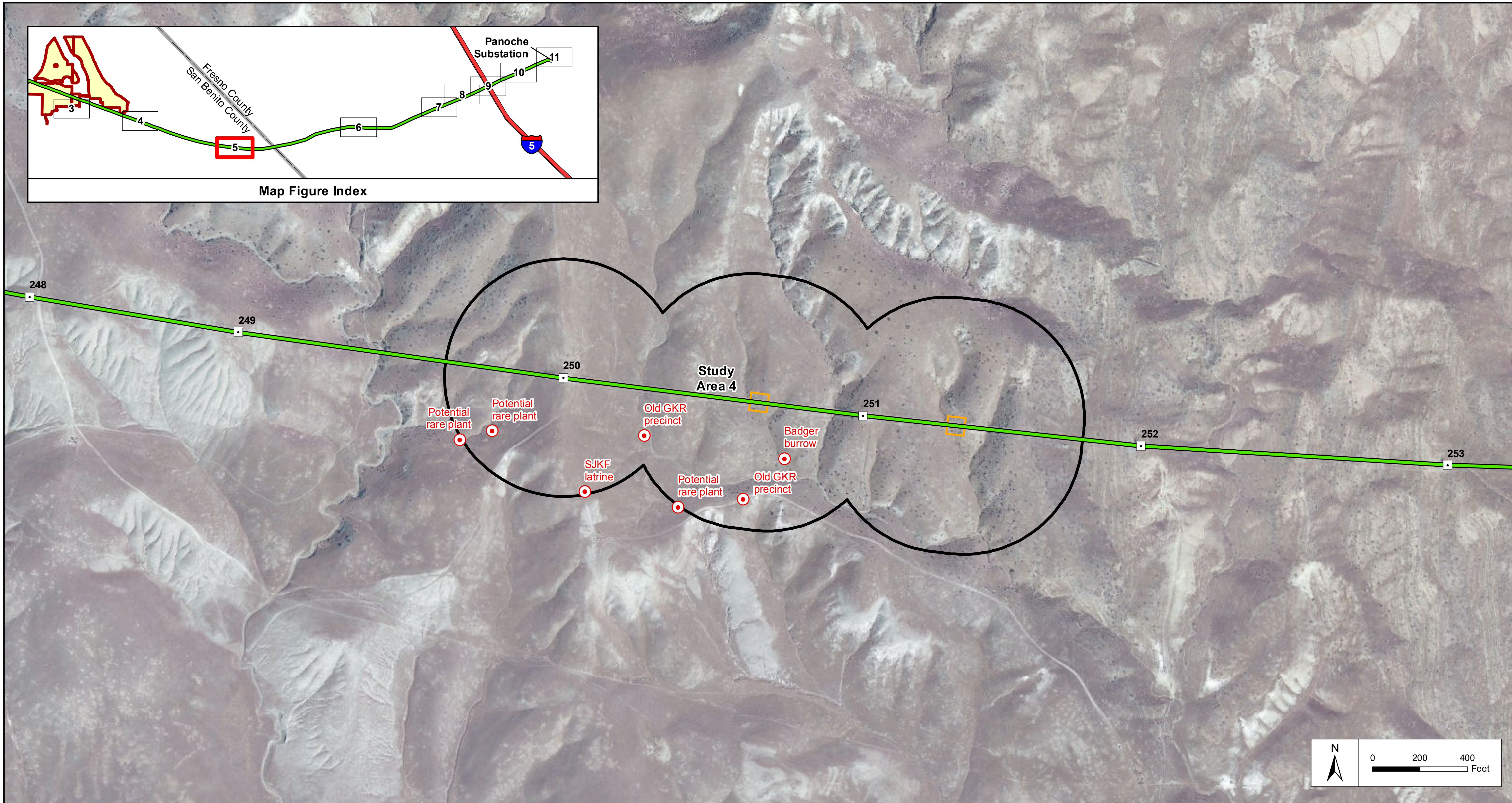
Telecom Upgrades

Study Areas 2 and 3

FIGURE

4

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- Wire Pull Site Work Area

Panoche Valley Solar Project

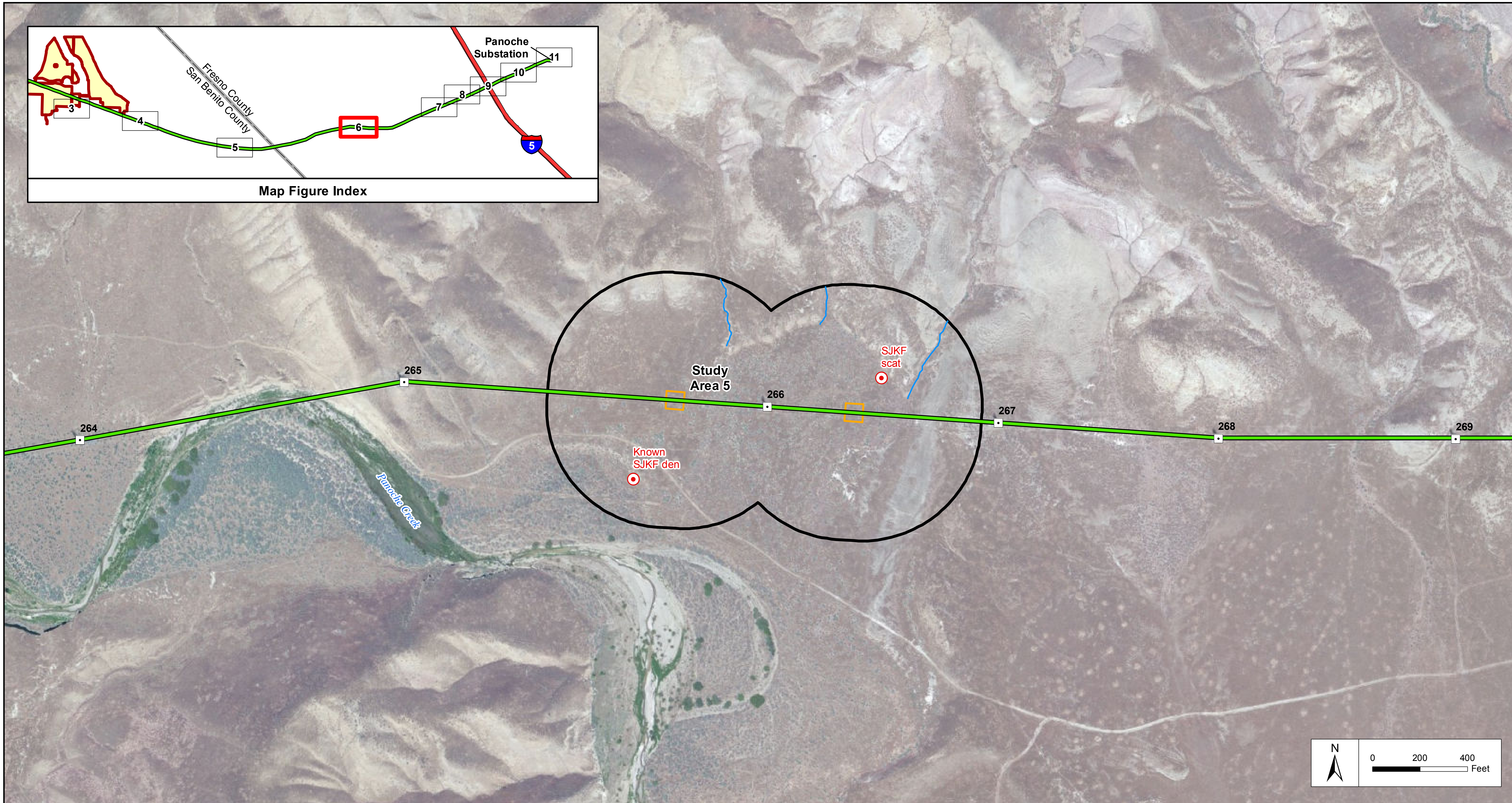
Telecom Upgrades

Study Area 4

FIGURE

5

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- Drainage
- Wire Pull Site Work Area

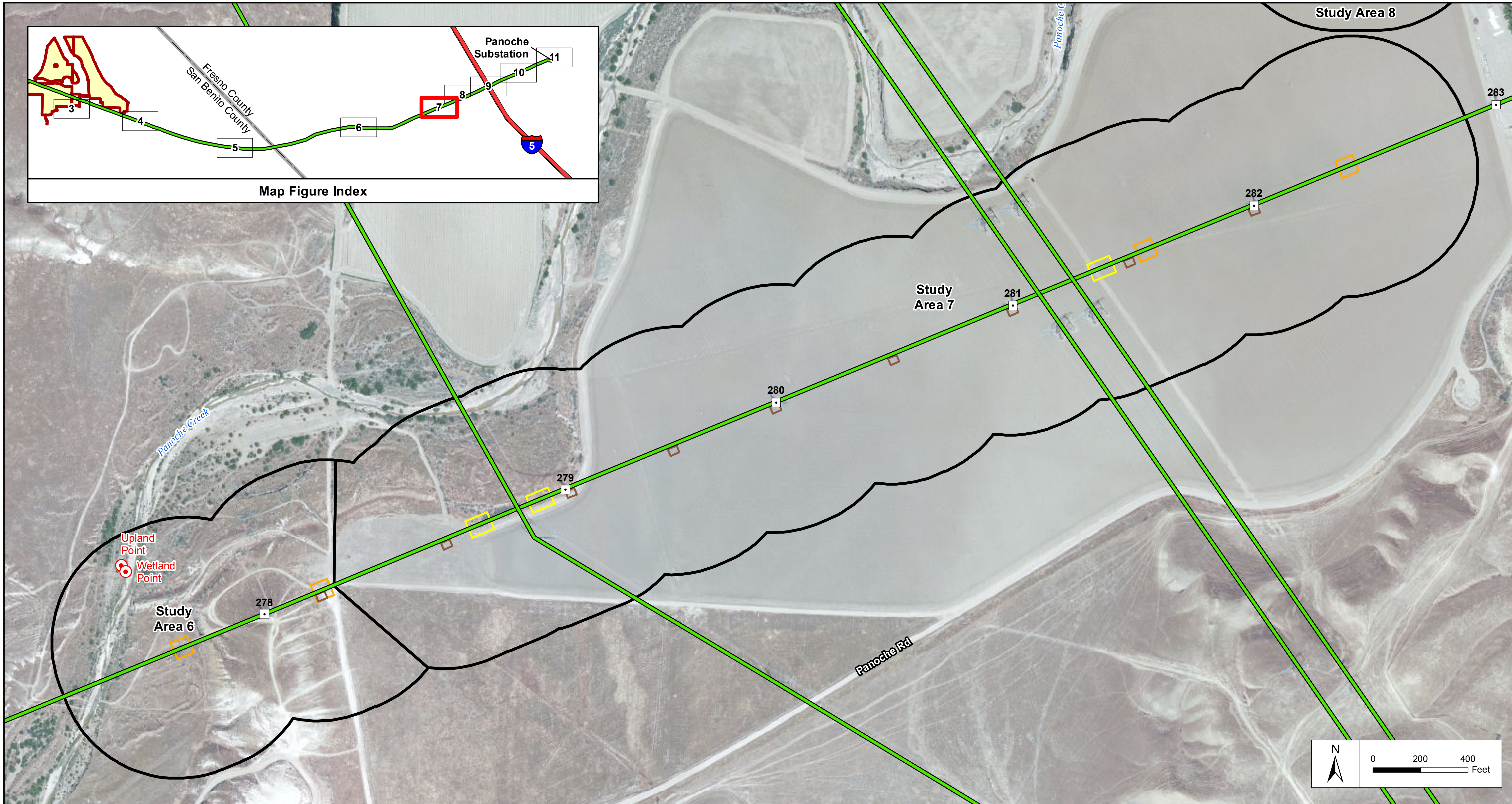
Panoche Valley Solar Project

Telecom Upgrades

Study Area 5

FIGURE 6

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- ADSS Pole Work Area
- Guard Structure Work Area
- Wire Pull Site Work Area

Panoche Valley Solar Project

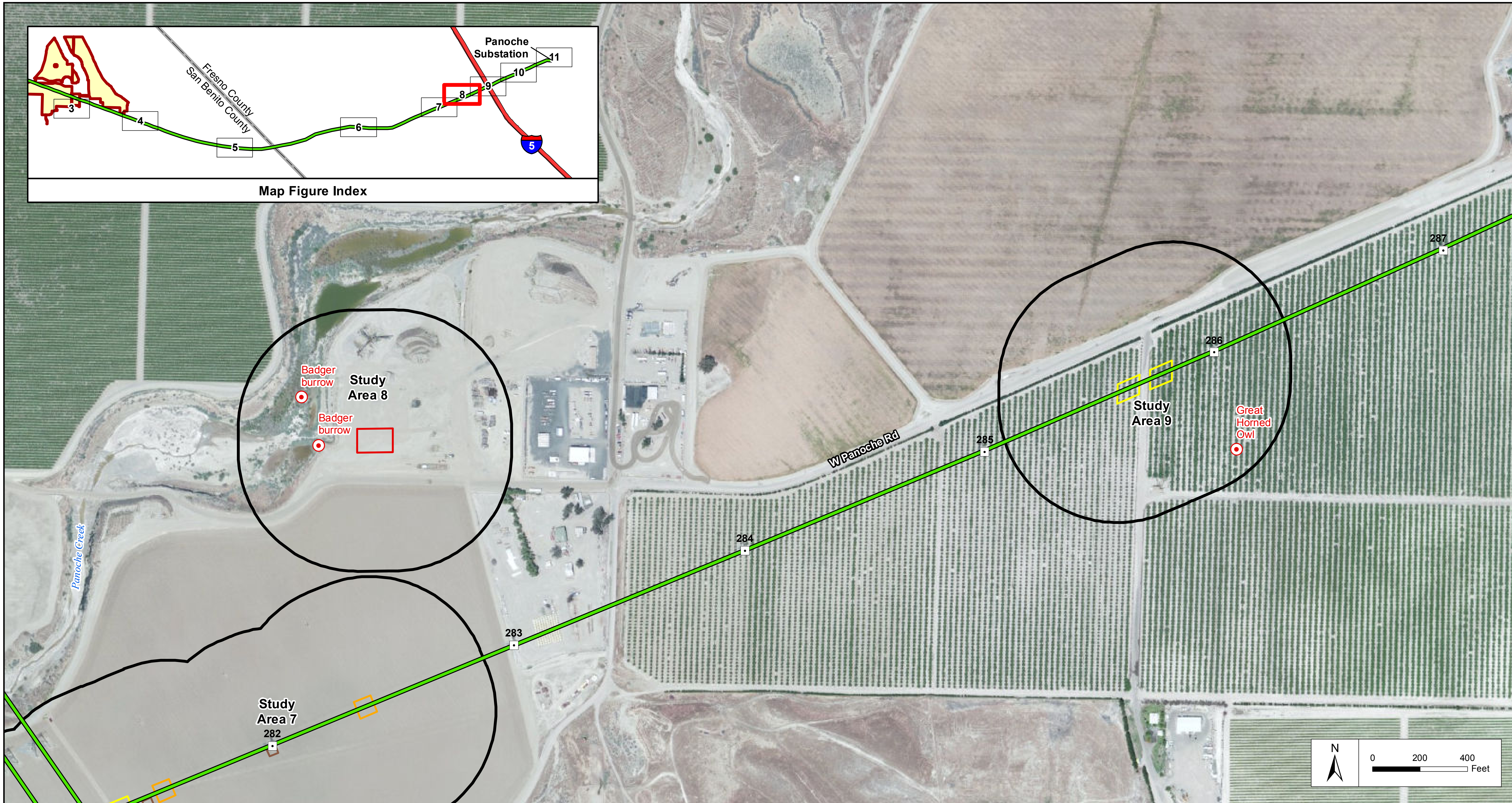
Telecom Upgrades

Study Areas 6 and 7

FIGURE

7

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- ADSS Pole Work Area
- Guard Structure Work Area
- Landing Zone Work Area
- Wire Pull Site Work Area

Panoche Valley Solar Project

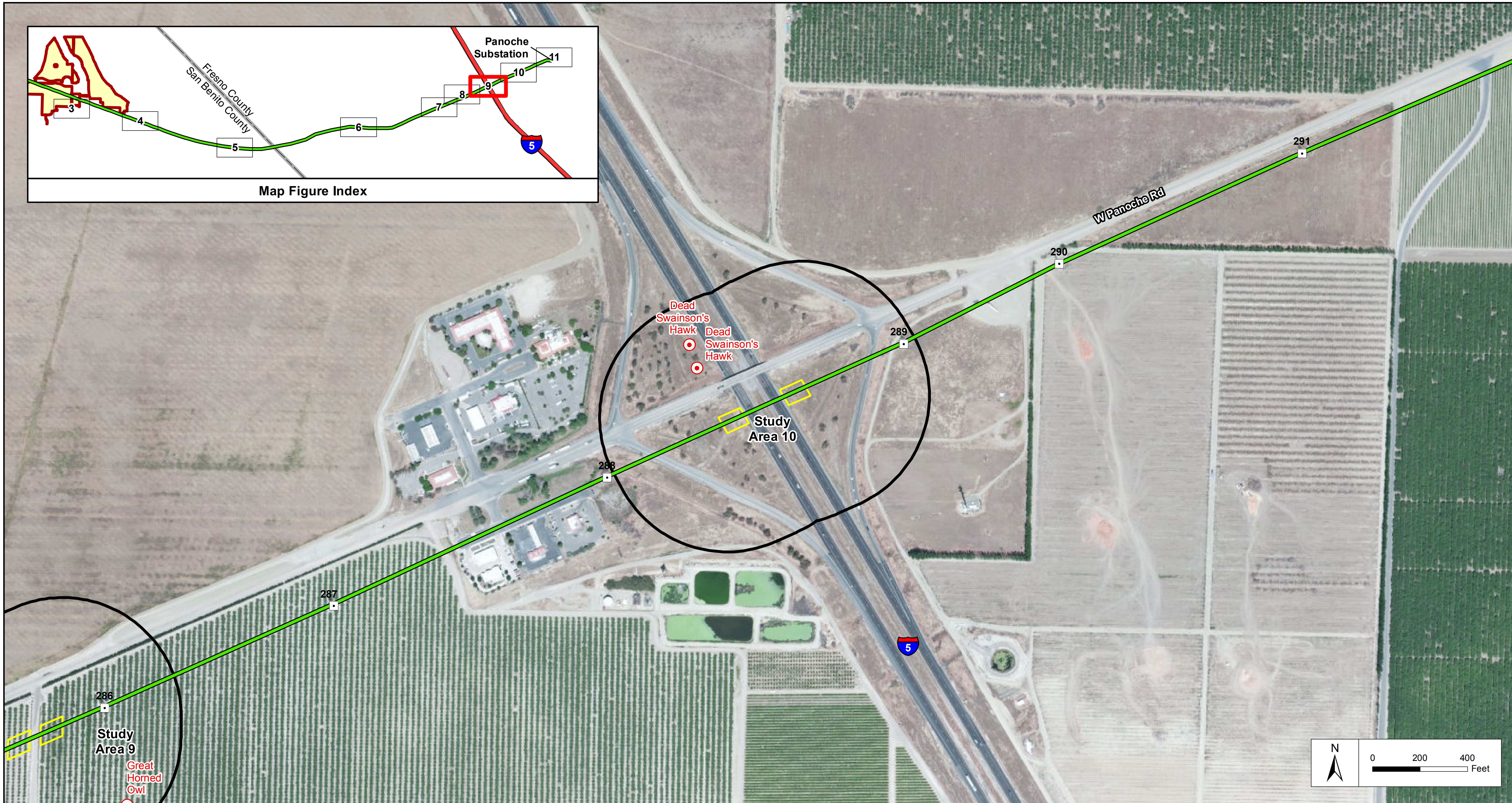
Telecom Upgrades

Study Areas 8 and 9

FIGURE

8

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- Guard Structure Work Area

Panoche Valley Solar Project

Telecom Upgrades

Study Area 10

FIGURE 9

JH 10/15/2014

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Legend

- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- Guard Structure Work Area

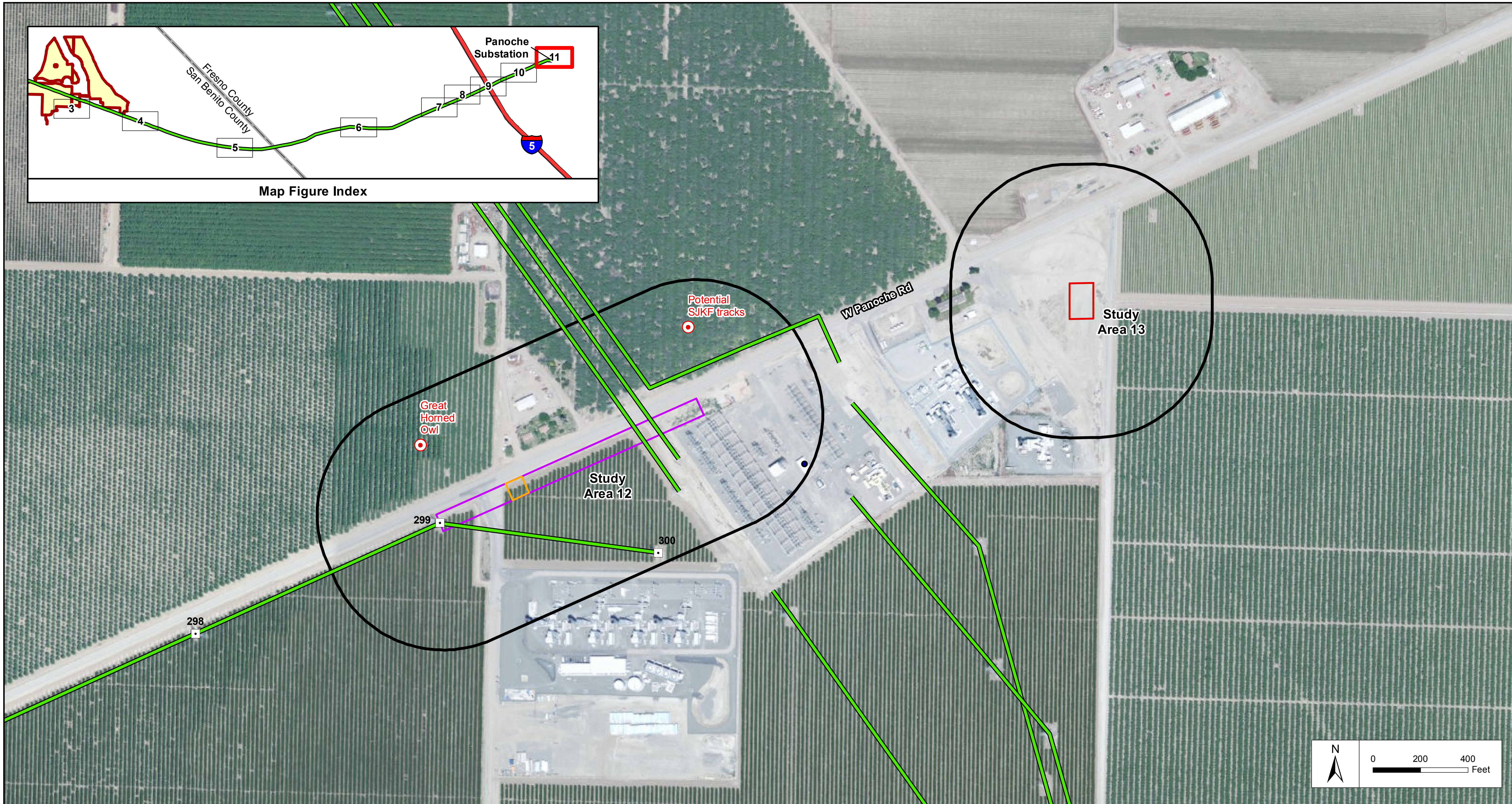
Panoche Valley Solar Project

Telecom Upgrades

Study Area 11

FIGURE 10

JH 10/15/2014



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Legend

- Survey Observation
- Study Area
- Existing Transmission Structure
- Existing Electric Transmission
- Landing Zone Work Area
- Panoche Substation OPGW UG Work Area
- Wire Pull Site Work Area

Panoche Valley Solar Project

Telecom Upgrades

Study Areas 12 and 13

FIGURE

11

JH 10/15/2014

APPENDICES

Appendix A

Special Status Species with Potential to Occur

Special-Status Wildlife with Potential to Occur

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Invertebrates					
Branchinecta longiantenna	longhorn Fairy Shrimp	FE	Not Likely To Occur	Clear to turbid grassland pools within San Joaquin Vernal Pool Region	NA
Branchinecta conservation	conservancy fairy shrimp	FE	Not Likely To Occur	Turbid water in vernal pools	NA
Branchinecta lynchi	vernal Pool Fairy Shrimp	FT	Not Likely to Occur	Vernal pools, vernal swales, alkaline pools, and road-side ditches	NA
Lepidurus packardi	vernal pool tadpole shrimp	FE	Not Likely To Occur	Clear, well vegetated vernal pools to turbid, alkali scald pools; generally in water deeper than 12 cm	NA
Reptiles					
Actinemys marmorata pallida	Southwestern pond turtle	CSC	Low	Slow-moving waterways with upland habitat accessible for basking.	6-8
Anniella pulchra pulchra	silvery legless lizard	CSC	Moderate	Sandy or loose loamy soils with adequate soil moisture	1-8
Gambelia sila	blunt-nosed leopard lizard	FE, SE, SFP	Present (Observed in Valley Floor Conservation Lands 2013)	Arid grasslands, alkali flats, low elevation foothills, large washes; burrows of other species typically used for cover and sparse vegetation preferred	1-7
Masticophis flagellum ruddocki	San Joaquin coachwhip	CSC	High	Desert, prairie, scrublands, juniper-grassland, and other habitats in dry, open terrain	1-13
Phrynosoma blainvillii	coast horned lizard	CSC	High	Open areas with sandy soil and low vegetation, lowlands along sandy washes with scattered shrubs	1-7
Rana draytonii	California red-legged frog	FT	Not Likely To Occur	Standing deep ponds, pools, and streams; tall vegetation	NA

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Thamnophis hammondii	two-striped garter snake	CSC	Not Likely To Occur	In or near permanent fresh water, along streams with rocky beds bordered by riparian vegetation	NA
Amphibians					
Ambystoma californiense	California tiger salamander	FT, STC	High	Burrows of small mammals within grassland or oak savannah with wetland breeding ponds up to one mile away	1-6
Spea hammondii	western spadefoot toad	CSC	Moderate	Open areas with sandy or gravelly soils within woodlands, grasslands, sandy washes, lowlands, and other habitats.	1-8
Birds					
Agelaius tricolor	tricolored blackbird	CSC	High	Nest in marshy areas and settle in areas with access to open water; forage in valley and foothill grassland and agricultural fields	4-7
Ammodramus savannarum	grasshopper sparrow	CSC	High	Open grasslands and prairies with patches of bare ground.	1-7
Aquila chrysaetos	golden eagle	SFP	Present	Partially or completely open country around mountains or hills within habitats ranging from desert to arctic	1-7
Asio flammeus	short-eared owl	CSC	Low (nesting)	Open country including tundra, prairie, grassland, sand dunes and other habitats; sufficient vegetation required for nesting	1-7
Asio otus	long-eared owl	CSC	Moderate	Combination of grassland for foraging and dense tall shrubs for nesting and roosting.	1-7, 9-13
Athene cunicularia	Burrowing owl	CSC	Present	Open grasslands with sparse vegetation and few shrubs, gentle topography and well-drained soils	1-8

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Buteo swainsonii	Swainson's hawk	ST	Present	Grasslands, sage flats, or swaths for nesting; nest within trees, often the only tree in the area	6-13
Charadrius montanus	mountain plover	CSC, FTC	Present (winter only)	Breeds onen plains at moderate elevations; winters in short-grass plains and fields, plowed fields, and sandy deserts.	1-10
Circus cyaneus	northern harrier	CSC	Present	Breeds in wide open habitats from tundra to prairie grasslands; nests on ground in grasses or wetland vegetation	1-7
Elanus leucurus	white-tailed kite	SFP	Moderate	Commonly found in savanna, woodlands, marshes, desert grassland, partially cleared lands and cultivated fields; avoids areas with excessive winter freeze	1-13
Gymnogyps californianus	California condor	FE, SE	Not Likely to Occur	Nest in caves on cliff faces in mountains; scavenge in habitats ranging from Pacific beaches to mountain forests and meadows	NA
Haliaeetus leucocephalus	bald eagle	SE, FP	Not Likely To Occur	Nest in areas adjacent to large bodies of water; in winter can be seen in dry, open uplands near open water	NA
Lanius ludovicianus	Loggerhead shrike	CSC	Present	Open country with scattered shrubs and trees	1-9
Pooecetes gramineus affinis	Oregon vesper sparrow	CSC	High (winter only)	Breeds in Oregon; most often found in hilly margins of Willamette Valley; dry, upland prairies and pastures; winters over much of California	1-6
Xanthocephalus xanthocephalus	yellow-headed Blackbird	CSC	Low	Breed and roost in freshwater wetlands with dense, emergent vegetation; forage in fields	4-7
Mammals					

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Ammospermophilus nelsoni	San Joaquin antelope squirrel	ST	Present	Dry flat or rolling terrain on alluvial and loamy soils; grassy, sparsely shrubby ground	1-7
Antrozous pallidus	pallid bat	CSC	High (foraging)	Desert habitats with rocky outcrops for roosting	1-13
Corynorhinus townsendii	Townsend's big-eared bat	CSC	Low (foraging)	Pine forests and arid desert scrub habitats with caves nearby for roosting; may roost in abandoned buildings	1-13
Dipodomys ingens	giant kangaroo rat	FE, SE	Present	Arid gentle slopes and plains with variable vegetative cover and well-drained soils	1-6
Dipodomys nitratoides brevinasus	short-nosed kangaroo rat	CSC	High	Grasslands with scattered shrubs and desert shrub associations on loose soils	1-6
Dipodomys elephantinus	big-eared kangroo rat	CSC	Not Likely to Occur	Chaparral areas; most often under dense vegetation	5
Eumops perotis	western mastiff bat	CSC	Moderate (foraging)	Broad, open areas within dry desert washes, floodplains, grasslands, agricultural areas, and other habitats. Crevices in cliff faces, high buildings, trees or tunnels required for roosting	1-13
Onychomys torridus tularensis	Tulare grasshopper mouse	CSC	High	Arid shrubland communities in hot, arid grassland and shrubland associations.	1-7
Taxidea taxus	American badger	CSC	Present	Dry, open grasslands and brushlands with little groundcover.	1-10
Vulpes macrotis mutica	San Joaquin kit fox	FE/ST	Present	Loose-textured soils within grasslands; habitat converted for urban uses are still utilized if remnants of native habitat are present.	1-10

FE = Federally Endangered. FT = Federally Threatened SE = State Endangered FTC = Federally Threatened Candidate

SFP = State Fully Protected CSC = California Species of Special Concern STC = State Threatened Candidate ST = State Threatened

Special-Status Plant Species with Potential to Occur

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Amsinckia vernicosa var *furcata*	forked fiddleneck	CNPS 4.2	High	Valley grassland and foothill woodlands	1-6
Androsace elongata ssp. *acuta*	California androsace	CNPS 4.2	Moderate	Slopes of chaparral, foothill woodlands, northern coastal scrub, and coastal sage scrub	4-6
Astragalus macrodon	Salinas milkvetch	CNPS 4.3	Low	Openings in chaparral, valley grasslands, and foothill woodlands; weak affinity to serpentine soil	1-6
Astragalus rattanii var. *jepsonianus*	Jepson's milkvetch	CNPS 1B.2	Low	Valley grasslands and foothill woodlands; strong affinity to serpentine soil	1-6
Atriplex cordulata	Heartscale	CNPS 1B.2	Low	Occurs in wetlands and non wetlands in shadscale scrub, valley grassland, and wetland-riparian communities; saline or alkaline soil	1-8
Atriplex coronata var. *coronata*	Crownscale	CNPS 4.2	Moderate	Vernal pools in shadscale scrub, valley grassland, freshwater wetlands, and wetland-riparian communities; usually occurs in wetlands	1-7
Atriplex depressa	Brittlescale	CNPS 1B.2	Low	Occurs in playas of shadscale scrub, valley grassland, alkali sink, and wetland-riparian communities; equally likely to occur in wetland and non wetlands; alkali soil	1-8
Atriplex joaquiniana	San Joaquin spearscale	CNPS 1B.2	Moderate	Meadows of shadscale scrub and valley grassland communities	1-6
Atriplex minuscula	Lesser saltscale	CNPS 1B.1	Low	Occurs in playas of shadscale scrub, valley grassland, and alkali sink communities; usually occurs in non wetlands	1-6
Atriplex subtilis	Subtle orache	CNPS 1B.2	Low	Valley and foothill grassland; often in vicinity of vernal pools; alkaline soils	1-6
Atriplex coronata var. *vallicola*	Lost Hills crownscale	CNPS 1B.2	High	Vernal pools in shadscale scrub, valley grassland, freshwater wetlands, and wetland-riparian communities; usually occurs in wetlands on alkaline substrates	1-6

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Blepharizonia plumosa	Big tarplant	CNPS 1B.1	Low	Often on slopes of valley grassland, foothill woodland, and chaparral; clay to clay-loam soils	1-6
California macrophylla	round-leaved filaree	CNPS 1B.1	High	Valley and foothill grassland, cismontane woodland; friable clay soils	1-6
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypays	CNPS 1B.1	Low	Sandy or gravelly openings of chaparral and foothill woodlands	1-6
Camissonia benetensis	San Benito evening-primrose	FT, CNPS 1B.1	Low	Serpentine-derived alluvial deposits in the vicinity of the Clear Creek Management Area in San Benito County	NA
Campanula exigua	chaparral harebell	CNPS 1B.2	Low	Talus slopes, occasionally other open places within chaparral communities; serpentine substrates	NA
Caulanthus californicus	California jewel-flower	FE, SE, CNPS 1B.1	Not Likely to Occur	Valley and foothill grassland, pinyon and juniper woodland, and chenopod scrub communities; subalkaline, sandy loam soils	1-6
Caulanthus coulteri var. *lemmonii*	Lemmon's jewel-flower	CNPS 1B.2	Moderate	Valley and foothill grassland, and pinyon and juniper woodland communities	1-6
Chorizanthe ventricosa	Potbellied spineflower	CNPS 4.3	Low	Mixed grassland communities, oak-pine woodlands; serpentine outcrops	1-6
Cordylanthus mollis ssp. *hispidus*	Hispid bird's-beak	CNPS 1B.1	Low	Meadows and playas of alkali sink, valley grassland, and wetland-riparian communities; generally occurs in wetlands; alkaline soils	1-6
Deinandra halliana	Hall's tarplant	CNPS 1B.1	High	Grassland, edges of alkali sinks, open muddy slopes; clayey soils	1-6
Delphinium californicum ssp. *interius*	California larkspur	CNPS 1B.2	Low	Foothill woodlands; usually occurs in non wetlands	1-6
Delphinium gypsophilum ssp. *gypsophilum*	gypsum-loving larkspur	CNPS 4.2	High	Slopes in valley grassland, alkali sink, foothill woodland communities	1-6
Delphinium recurvatum	recurved larkspur	CNPS 1B.2	Low	Annual grasslands or in association with saltbush scrub or valley sink scrub habitats; sandy or clay alkaline soils	1-6
Eriogonum gossypinum	cottony buckwheat	CNPS 4.2	Low	Shadscale scrub and valley grassland commmunities; clay soils	1-6

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Eriogonum temblorense	Temblor buckwheat	CNPS 1B.2	Moderate	Valley and foothills grassland, sandstone outcrops	1-6
Eriogonum vestitum	Idria buckwheat	CNPS 4.3	High	Saltbush scrub communities, steep shale slopes, occasionally on sandstone	1-8
Fritillaria falcata	talus fritillary	CNPS 1B.2	Low	Talus slopes in chaparral communities; endemic to serpentine soils	NA
Fritillaria viridea	San Benito fritillary	CNPS 1B.2	Low	Chaparral communities; endemic to serpentine soils	NA
Lagophylla diabolensis	Diablo Range hare-leaf	CNPS 1B.2	Moderate	Valley grasslands and foothill woodland communities	1-6
Layia discoidea	rayless layia	CNPS 1B.1	Low	Talus slopes and alluvial terraces within chaparral communities; serpentine soils	NA
Layia heterotricha	pale-yellow layia	CNPS 1B.1	High	Cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland communities; alkaline and clay soils	1-6
Layia munzii	Munz's tidytips	CNPS 1B.2	High	Shadscale scrub, valley grassland, and wetland-riparian communities; usually occurs in wetlands; alkaline or clay soils	1-8
Lepidium jaredii ssp. *Album*	Panoche pepper-grass	CNPS 1B.2	Moderate	Washes and alluvial fans of valley grassland communities	1-8
Leptosiphon ambiguus	Serpentine Linanthus	CNPS 4.2	High	Valley grassland, foothill woodland, and northern coast scrub communities; serpentine soils	1-6
Madia radiata	showy golden madia	CNPS 1B.1	High	Slopes of valley and foothill grasslands and foothill woodland communities; friable clay and calcium-rich soils	1-8
Malacothamnus aboriginum	Indian Valley bush malllow	CNPS 1B.2	Low	Open, rocky slopes and dry hills of chaparral and cismontane woodland communities	5-6
Monolopia congdonii	San Joaquin woollythreads	FE, CNPS 1B.2	High	Nonnative grassland, valley saltbush scrub, saltbush scrub, interior coast range saltbush scrub communities; neutral to subalkaline sandy or sandy-loam soils in San Joaquin Vallley.	1-6
Navarretia nigelliformis	adobe navarretia	CNPS 4.2	Moderate	Valley and foothill grasslands and wetland-riparian communities, generally found in wetlands; clay, sometimes serpentine soil	1-8

Scientific Name	Common Name	Status	Potential to Occur	Habitat	Potential Study Areas
Navarretia prostrata	prostrate vernal pool navarretia	CNPS 1B.1	Low	Vernal pools and alkaline floodplains of coastal sage scrub and wetland-riparian communities, occasionally in alkaline vallley and foothill grassland communities; usuallly occur in wetlands	1-8
Phacelia phacelioides	Mt. Diablo phacelia	CNPS 1B.2	Low	Chaparral and foothill woodland communities; strong affinity for serpentine soils	1-6
Senecio aphanactis	Chaparral ragwort	CNPS 2.B2	Low	Foothill woodlands, northern coastal scrub, and coastal sage scrub communities; often in serpentine soils	1-6

FE = Federally Endangered.	SE = State Endangered.	CNPS = California Native Plant Society.
1B = Plants that are rare, threatened, or endangered in California and elsewhere.	4 = A watch list of plants of limited distribution.	
0.1: Seriously endangered in California.	0.2: Fairly endangered in California.	0.3: Not very endangered in California.

Appendix B

Photographic Log

Photographic Log

Photo 1: Study Area 1 from the southern study area boundary looking northwest.

Photo 2: Study Area 2 looking west from southeast study area boundary.

Photo 3: View of Study Area 2 facing northwest.

Photo 4: View of Study Area 3 facing northeast.


Photo 5: Small drainage along eastern boundary of Study Area 3.


Photo 6: View of southern portion of Study Area 3 facing west.


Photo 7: View of Study Area 4 facing north.


Photo 8: Study Area 4 facing east/northeast from southern portion of study area.

Photo 9: Study Area 4 facing west from access road.

Photo 10: View of Study Area 4 facing west.


Photo 11: View of Study Area 5 facing west from eastern portion of study area.


Photo 12: Study Area 5 facing west/northwest.

Photo 13: View of Study Area 5 facing east.

Photo 14: Study Area 6 facing southeast.

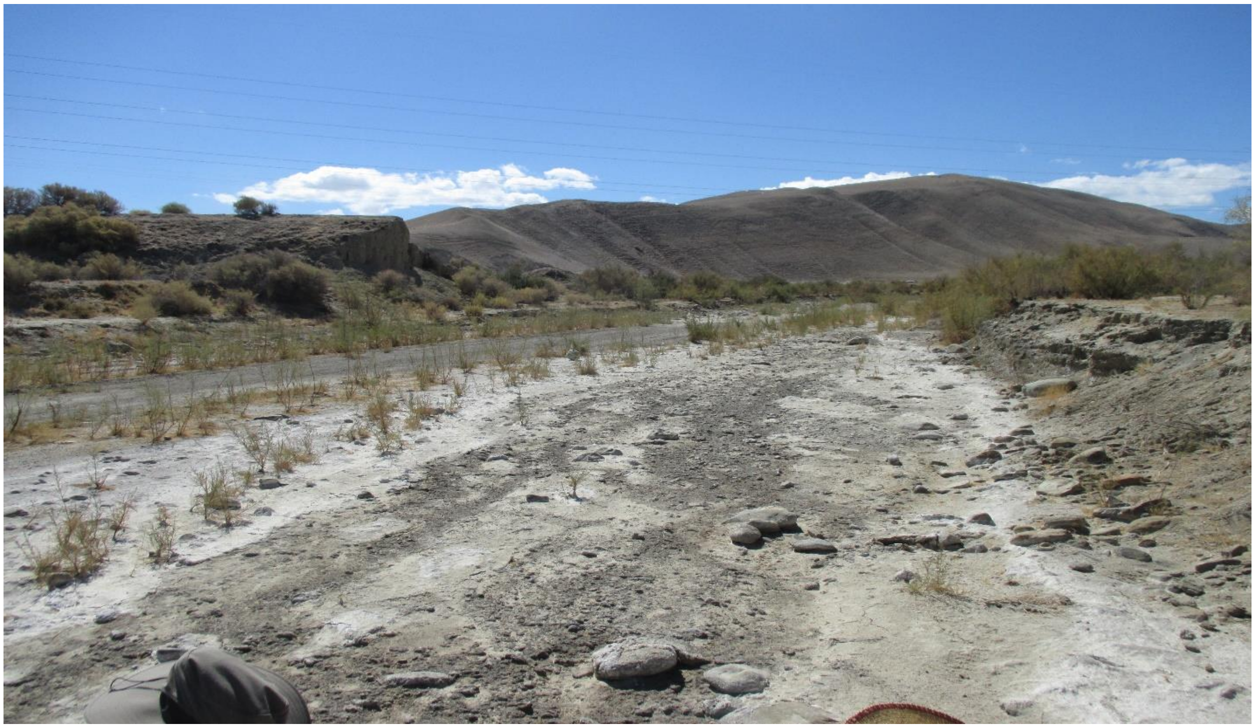
Photo 15: Northwestern portion of Study Area 6 within Panoche Creek bed.


Photo 16: View facing east from wetland soil data point within Panoche Creek in Study Area 6.


Photo 17: View facing south from upland soil data point in Study Area 6.


Photo 18: View of central portion of Study Area 6 facing east.


Photo 19: View of Study Area 6 facing north.


Photo 20: View of well-maintained crop rows within Study Area 7.

Photo 21: View of Study Area 7 taken from Study Area 6 facing east.

Photo 22: Southern portion of Study Area 8 taken from central cleared portion of study area.

Photo 23: View of Panoche Creek located in northern portion of Study Area 8.

Photo 24: View of well-maintained almond orchards of Study Area 9.

Photo 25: View of Study Area 9 facing east.

Photo 26: View of southeast quarter of Study Area 10 facing north.


Photo 27: View of southwest quarter of Study Area 10 facing south.


Photo 28: View of southeast quarter of Study Area 10, facing south.

Photo 29: View of northeast quarter of Study Area 10 facing north.

Photo 30: View of northwest quarter of Study Area 10 facing north.

Photo 31: Northern portion of Study Area 11 facing west showing recreational area and orchards.

Photo 32: View of vineyards within southern portion of Study Area 11.

Photo 33: View of Study Area 12 facing east/southeast.

Photo 34: View of northern portion of Study Area 12 within almond orchards.

Photo 35: View of Study Area 12 facing west along West Panoche Road.

Photo 36: View of Study Area 13 facing west towards Panoche Substation.

Photo 37: Cleared area within central portion of Study Area 13.

Appendix C

Vegetation List by Work Area

Vegetation by Study Area

Study Area	FAMILY	GENUS	SPECIES	COMMON NAME
Study Area 1	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Brassicaceae	*Caulanthus*	*californicua*	California jewel flower
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Convolvulaceae	*Convolvulus*	*arvensis*	bindweed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Malvaceae	*Malva*	*parviflora*	cheeseweed
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Hordeum*	*murinum*	barley
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Solanaceae	*Solanum*	*xanti*	nightshade
	Zygophyllaceae	*Tribulus*	*terrestris*	puncture vine
Study Area 2	Asteraceae	*Holocarpha*	*virgata* ssp. *virgata*	tarplant
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Chenopodiaceae	*Atriplex*	*rosea*	tumbling orach
	Chenopodiaceae	*Atriplex*	*polycarpa*	allscale saltbush
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Lamiaceae	*Trichostema*	*lanceolatum*	vinegar weed
	Poaceae	*Avena*	*fatua*	wild oat
	Poaceae	*Bromus*	*madritensis*	red brome
	Poaceae	*Bromus*	*hordeaceus*	soft chess
	Poaceae	*Distichlis*	*spicata*	salt grass
	Poaceae	*Hordeum*	*murinum*	barley
Study Area 3	Asteraceae	*Holocarpha*	*virgata* ssp. *virgata*	tarplant
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Chenopodiaceae	*Atriplex*	*rosea*	tumbling orach
	Chenopodiaceae	*Atriplex*	*polycarpa*	allscale saltbush
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree

Study Area	FAMILY	GENUS	SPECIES	COMMON NAME
Study Area 3	Lamiaceae	*Trichostema*	*lanceolatum*	vinegar weed
	Polygonaceae	*Eriogonum*	*angulosum*	angle-stem wild buckwheat
	Poaceae	*Avena*	*fatua*	wild oat
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Bromus*	*hordeaceus*	soft chess
	Poaceae	*Distichlis*	*spicata*	salt grass
	Poaceae	*Hordeum*	*murinum*	barley
Study Area 4	Asteraceae	*Ericameria*	*linearifolia*	interior goldenbush
	Asteraceae	*Deinandra*	sp.	Potential rarity*
	Asteraceae	*Gutierrezia*	*californica*	California matchweed
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Boraginaceae	*Phacelia*	*tanacetifolia*	tansy phacelia
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Ephedraceae	*Ephedra*	*californica*	California ephedra
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Lamiaceae	*Salvia*	*columbariae*	chia
	Lamiaceae	*Trichostema*	*lanceolatum*	vinegar weed
	Polemoniaceae	*Navarretia*	sp.	Potential rarity*
	Polygonaceae	*Eriogonum*	*fasciculatum*	California buckwheat
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Schismus*	*arabicus*	Mediterranean grass
	Poaceae	*Poa*	*secunda* ssp. *secunda*	one-sided blue grass
Study Area 5	Asteraceae	*Centaurea*	*melitensis*	tocalote
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Chenopodiaceae	*Atriplex*	*rosea*	tumbling orach
	Chenopodiaceae	*Atriplex*	*polycarpa*	allscale saltbush
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Plantaginaceae	*Plantago*	*ovata*	plantain
	Polygonaceae	*Eriogonum*	*angulosum*	angle-stem buckwheat
	Polygonaceae	*Eriogonum*	*fasciculatum*	California buckwheat
	Poaceae	*Bromus*	*diandrus*	ripgut brome
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Schismus*	*arabicus*	Mediterranean grass
	Poaceae	*Poa*	*secunda* ssp. *secunda*	one-sided blue grass
Study Area 6	Asteraceae	*Gutierrezia*	*californica*	california matchweed
	Asteraceae	*Isocoma*	*acradenia* var. *bracteosa*	alkali goldenbush
	Asteraceae	*Stephanomeria*	*pauciflora*	wirelettuce
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Boraginaceae	*Heliotropium*	*curassavicum* var. *osculatum*	alkali heliotrope
	Chenopodiaceae	*Atriplex*	*rosea*	tumbling orach

Study Area	FAMILY	GENUS	SPECIES	COMMON NAME
Study Area 6	Chenopodiaceae	*Atriplex*	*polycarpa*	allscale saltbush
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Plantaginaceae	*Plantago*	*ovata*	plantain
	Polygonaceae	*Eriogonum*	*angulosum*	angle-stem buckwheat
	Polygonaceae	*Eriogonum*	*fasciculatum*	California buckwheat
	Poaceae	*Bromus*	*diandrus*	ripgut brome
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Distichlis*	*spicata*	saltgrass
	Poaceae	*Hordeum*	*murinum*	barley
	Poaceae	*Polypogon*	*monspeliensis*	annual beard grass
	Poaceae	*Poa*	*secunda* ssp. *secunda*	one-sided blue grass
	Tamaricaceae	*Tamarix*	*ramosissima*	saltcedar
Study Area 7	Punicaceae	*Punica*	*granatum*	pomegranate
	Vitaceae	*Vitis*	*vinifera*	wine grape
Study Area 8	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Asteraceae	*Baccharis*	*salicifolia* ssp. *salicifolia*	mule fat
	Asteraceae	*Isocoma*	*acradenia* var. *bracteosa*	alkali goldenbush
	Asteraceae	*Sonchus*	*oleraceus*	common sow thistle
	Asteraceae	*Xanthium*	*strumarium*	cocklebur
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Boraginaceae	*Heliotropium*	*curassavicum* var. *osculatum*	alkali heliotrope
	Chenopodiaceae	*Atriplex*	*lentiformis*	big saltbush
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Poaceae	*Bromus*	*diandrus*	ripgut brome
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Solanaceae	*Nicotiana*	*glauca*	tree tobacco
	Tamaricaceae	*Tamarix*	*ramosissima*	saltcedar
Study Area 9	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Convolvulaceae	*Convolvulus*	*arvensis*	bindweed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Malvaceae	*Malva*	*parviflora*	cheeseweed
	Poaceae	*Poa*	*annua*	annual blue grass
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Sporobolus*	*airoides*	alkali sacaton
	Solanaceae	*Solanum*	*xanti*	nightshade

Study Area	FAMILY	GENUS	SPECIES	COMMON NAME
Study Area 10	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Asteraceae	*Ambrosia*	*acanthicarpa*	annual bur-sage
	Asteraceae	*Helianthus*	*californicus*	California sunflower
	Asteraceae	*Isocoma*	*acradenia* var. *bracteosa*	alkali goldenbush
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Hirschfeldia*	*incana*	summer mustard
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Chenopodiaceae	*Chenopodium*	*sp.*	
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Convolvulaceae	*Convolvulus*	*arvensis*	bindweed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Malvaceae	*Malva*	*parviflora*	cheeseweed
	Myrtaceae	*Eucalyptus*	*camaldulensis*	red gum
	Palmae			Introduced Palm
	Poaceae	*Avena*	*fatua*	wild oats
	Poaceae	*Bromus*	*diandrus*	ripgut brome
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Distichilis*	*spicata*	saltgrass
	Poaceae	*Hordeum*	*murinum*	barley
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Solanaceae	*Nicotiana*	*glauca*	tree tobacco
	Solanaceae	*Solanum*	*xanti*	nightshade
	Zygophyllaceae	*Tribulus*	*terrestris*	puncture vine
Study Area 11	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Convolvulaceae	*Cressa*	*truxilliensis*	alkali weed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Martyniaceae	*Proboscidea*	*lutea*	unicorn plant
	Poaceae	*Bromus*	*carinatus*	California brome
	Salicaceae	*Salix*	*gooddingii*	Goodding's black willow
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Tamaricaceae	*Tamarix*	*ramosissima*	saltcedar
Study Area 12	Asteraceae	*Erigeron*	*canadensis*	horseweed
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Convolvulaceae	*Convolvulus*	*arvensis*	bindweed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed

Study Area	FAMILY	GENUS	SPECIES	COMMON NAME
Study Area 12	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Malvaceae	*Malva*	*parviflora*	cheeseweed
	Poaceae	*Avena*	*fatua*	wild oat
	Poaceae	*Cynodon*	*dactylon*	Bermuda grass
	Poaceae	*Hordeum*	*murinum*	barley
	Salicaceae	*Populus*	*fremontii*	Fremont's cottonwood
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Solanaceae	*Solanum*	*xanti*	nightshade
	Zygophyllaceae	*Tribulus*	*terrestris*	puncture vine
Study Area 13	Amaranthaceae	*Amaranthus*	*blitoides*	procumbent pigweed
	Asteraceae	*Erigeron*	*canadensis*	horseweed
	Asteraceae	*Lactuca*	*serriola*	prickly lettuce
	Boraginaceae	*Amsinckia*	*intermedia*	common fiddleneck
	Brassicaceae	*Lepidium*	*nitidum*	shiny peppergrass
	Cactaceae	*Opuntia*	*ficus-indica*	Mission prickly pear
	Chenopodiaceae	*Atriplex*	*roseum*	tumbling orach
	Chenopodiaceae	*Chenopodium*	*album*	lamb's quarter
	Chenopodiaceae	*Salsola*	*tragus*	Russian thistle
	Convolvulaceae	*Convolvulus*	*arvensis*	bindweed
	Convolvulaceae	*Cressa*	*truxilliensis*	alkali weed
	Euphorbiaceae	*Chamaesyce*	*ocellata* ssp. *ocellata*	prostrate spurge
	Euphorbiaceae	*Croton*	*setigerus*	dove weed
	Geraniaceae	*Erodium*	*cicutarium*	redstem filaree
	Lamiaceae	*Trichostema*	*lanceolatum*	vinegar weed
	Malvaceae	*Malva*	*parviflora*	cheeseweed
	Onagraceae	*Epilobium*	*sp.*	
	Poaceae	*Avena*	*fatua*	wild oat
	Poaceae	*Bromus*	*carinatus*	California brome
	Poaceae	*Bromus*	*madritensis* ssp. *rubens*	red brome
	Poaceae	*Cynodon*	*dactylon*	Bermuda grass
	Poaceae	*Hordeum*	*murinum* ssp.	barley
	Salicaceae	*Populus*	*fremontii*	Fremont's cottonwood
	Solanaceae	*Datura*	*wrightii*	Jimson weed
	Solanaceae	*Solanum*	*xanti*	nightshade
	Zygophyllaceae	*Tribulus*	*terrestris*	puncture vine

* Could not be identified to species due to poor condition of specimens and season

Appendix D
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: PVS Study Area 6 City/County: NA/Fresno Sampling Date: 9/18/2014

Applicant/Owner: PV2 State: CA Sampling Point: Wetland 1

Investigator(s): Russell Kokx, Morgan Edel, Julianne Wooten Section, Township, Range: S16, T15S, R12E

Landform (hillslope, terrace, etc.): dry creek bed Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): _____ Lat: 36.626284° Long: -120.661358° Datum: NAD83

Soil Map Unit Name: Cerini-Anela-Fluvaquents, saline-Sodic association NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?**	**Yes** ☐	**No** ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: Panoche Creek

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
50% = _____, 20% = _____	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size:_____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
50% = _____, 20% = _____	_____	= Total Cover	
Herb Stratum (Plot size: i m)			
1. *Distichlis spicata*	25	yes	FAC
2. *Polypogon monspeliensis*	20	no	FACW
3. *Tamarix ramosissima*	5	no	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
50% = _____, 20% = _____	_____	= Total Cover	
Woody Vine Stratum (Plot size:_____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
50% = _____, 20% = _____	_____	= Total Cover	
% Bare Ground in Herb Stratum 50	% Cover of Biotic Crust _____		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	_____	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

	Total % Cover of :	Multiply by:	
OBL species	_____	x1 =	_____
FACW species	20	x2 =	40
FAC species	30	x3 =	90
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	50 (A)		130 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is $\leq$3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

Project Site: PVS Study Area 6

SOIL

Sampling Point: Wetland 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
4	2.5Y 5/4	100					loamy sand	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR C)**
- [ ] 2 cm Muck (A10) **(LRR B)**
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [X] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (Inches): ____

Hydric Soils Present? **Yes** [ ] **No** [X]

Remarks: Point within Panoche Creek inundated only after storm event.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) **(Nonriverine)**
- [ ] Sediment Deposits (B2) **(Nonriverine)**
- [ ] Drift Deposits (B3) **(Nonriverine)**
- [X] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [X] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [X] Water Marks (B1) **(Riverine)**
- [X] Sediment Deposits (B2) **(Riverine)**
- [X] Drift Deposits (B3) **(Riverine)**
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes [ ]	No [X]	Depth (inches):	____
Water Table Present?	Yes [ ]	No [X]	Depth (inches):	____
Saturation Present? (includes capillary fringe)	Yes [ ]	No [X]	Depth (inches):	____

Wetland Hydrology Present? **Yes** [X] **No** [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: PVS Study Area 6 City/County: NA/Fresno Sampling Date: 9/18/2014

Applicant/Owner: PV2 State: CA Sampling Point: Upland 1

Investigator(s): Russell Kokx, Morgan Edel, Julianne Wooten Section, Township, Range: S16, T15S, R12E

Landform (hillslope, terrace, etc.): dry creek bed Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): _____ Lat: 36.626357° Long: -120.661423° Datum: NAD83

Soil Map Unit Name: Cerini-Anela-Fluvaquents, saline-Sodic association NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima*	30	yes	FAC
2. _____			
3. _____			
4. _____			
50% = _____, 20% = _____	30	= Total Cover	
Sapling/Shrub Stratum (Plot size:_____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
50% = _____, 20% = _____	_____	= Total Cover	
Herb Stratum (Plot size:i m)			
1. *Bromus madritensis*	20	no	FACU
2. *Erodium cicutarium*	10	no	FACU
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
50% = _____, 20% = _____	_____	= Total Cover	
Woody Vine Stratum (Plot size:_____)			
1. _____			
2. _____			
50% = _____, 20% = _____	_____	= Total Cover	
% Bare Ground in Herb Stratum 40	% Cover of Biotic Crust _____		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33	(A/B)

Prevalence Index worksheet:

	Total % Cover of :	Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	30	x3 =	90
FACU species	30	x4 =	120
UPL species	_____	x5 =	_____
Column Totals:	60 (A)		210 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

Project Site: PVS Study Area 6

SOIL

Sampling Point: Upland 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (Moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
8	10YR 4/4	100					sandy loam	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR C)**
- ☐ 2 cm Muck (A10) **(LRR B)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) **(Nonriverine)**
- ☐ Sediment Deposits (B2) **(Nonriverine)**
- ☐ Drift Deposits (B3) **(Nonriverine)**
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) **(Riverine)**
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☒ Drift Deposits (B3) **(Riverine)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):		
Water Table Present?	Yes ☐	No ☒	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):		

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

RESULTS OF 2010 ADULT AND JUVENILE BNLL SURVEYS CONDUCTED ON SECTION 16 OF TOWNSHIP 15S, RANGE 10E FOR SOLARGEN ENERGY'S PANOCHE VALLEY SOLAR FARM

Prepared by:
Live Oak Associates, Inc.

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Michele Korpos, Senior Project Manager and Wildlife Biologist
Mark Jennings, Ph.D., Senior Associate Herpetologist
Katrina Huck, Staff Ecologist

Prepared for:
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22 September 2010 PN: 1297-10B

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1 INTRODUCTION

The following is a report of findings relating to 2010 adult and juvenile blunt-nosed leopard lizard (*Gamelia sila*)(BNLL) surveys conducted by Live Oak Associates, Inc. (LOA) on a single-Section subset of land within the Panoche Valley Solar Farm project site. The proposed Solargen Energy's Panoche Valley Solar Farm is located approximately 15 miles west of Highway 5 along West Shields, Panoche and Little Panoche Roads in eastern San Benito County.

The outline of the proposed project is irregularly-shaped, and can be found in the Panoche, Mercey Hot Springs, Llanada, and Cerro Colorado 7.5 minute U.S. Geological Survey quadrangles in Sections 3, 4, 8-11, and 13-16 of Township 15 South, Range 10 East; and section 19 of Township 15 South, Range 11 East. The majority of parcels within the site are used for cattle grazing. The site is surrounded by rangeland and bordered to the west by the Gabilan Range and to the east by the Panoche Hills. A number of drainages and creeks are present in the area including the Panoche and Las Aguilas Creeks. The portion of the Valley associated with the proposed project ranges in elevation from approximately 1240 feet above sea level to approximately 1400 feet.

1.1 PROJECT DESCRIPTION

Solargen Energy Inc. proposes to construct and operate a 420 Megawatt solar photovoltaic (PV) energy generating facility that would be named the Panoche Ranch Solar Farm (Farm). This site comprises approximately 4885 acres located in the eastern portion of San Benito County.

The Farm is proposed, in part, to support California in meeting the Renewable Portfolio Standard mandate, requiring investor-owned utilities to supply 20% of their total electricity through renewable energy by the year 2010. Benefits of the proposed Farm include the following:

- Direct conversion of sunlight to electricity through the PV effect does not require water to generate electricity
- Solargen's PV panels consist of non-toxic materials such as glass, silicon, concrete and steel
- The Farm would offset potential emissions of greenhouse gases that contribute to climate change and other pollutants such as nitrogen dioxide from fossil fuel fired power plants

The Farm would be constructed on contiguous parcels of land historically used for grazing. A buffer zone with a minimum width of 35-feet would be maintained between the PV panels and surrounding land and the operation of the Farm would not interfere with adjacent land uses currently in place.

The selection of the site in Panoche Valley is based mainly on sun light, topography and proximity to the Moss to Panoche transmission line owned by PG&E. This line provides a

FIGURE 1. VICINITY MAP

unique opportunity to connect energy produced at the Farm to an existing point on the system with available electric transmission capacity. The Panoche Valley offers a relatively level valley floor, occurring between approximately 1240 and 1400 feet above sea level. The Panoche Valley area supports a strong solar resource according to the National Renewable Energy Laboratory Solar Radiation Database (http://www.nrel.gov/gis/data_analysis.html), which has collected data for the last decade on various locations around the United States. The Farm would be expected to remain in operation for at least 30 years, with the possibility of a subsequent re-powering for additional years of operation. The energy produced here would mainly benefit users in San Benito and Fresno Counties, though outlying customers would also receive a portion of their energy from the Farm.

The Farm would consist primarily of PV panels on steel support structures, which would be dark in color. These panels would be arranged in rows, with panels tilting upward and facing south or southwest. Each panel would be 7- by 8-feet and they would stand no more than 15-feet above the ground. The panels would be arranged in blocks, and each block would be supported by an inverter and transformer. These units would stand no more than 25-feet above the ground. Medium-voltage collection system lines would be buried underground. It is believed that this system, with no moving parts, no thermal cycle, no water needs, a low visual profile and underground collection system would help minimize the Farm's potential impacts to the environment.

Due to the topography of the Panoche Valley, the installation of the Farm would not require large-scale grading. The main areas of grading would occur for all-weather access roads, the Farm substation, and an operations and maintenance (OM) facility. The roads would be heavily used during the construction phase, and then rarely used for maintenance in subsequent years.

As stated previously, the Farm would not require water to generate electricity. However, some water would be required for sanitary facilities and for periodic panel cleaning. It is estimated that these uses would require approximately 10.5 acre-feet of water per year, based on a one time per year cleaning schedule. This annual water demand represents approximately 6% of that used for a similar-sized solar thermal facility, based on recent California Energy Commission information. It is estimated that the construction of the Farm would take approximately 6 years to complete, and during this time, additional water would be necessary for sanitary facilities, dust control, initial panel washing and manufacturing concrete. Solargen is exploring opportunities to clean and recycle gray water for reuse onsite. Existing onsite wells should be sufficient to serve the Farm's water needs, however thorough studies of the water resources both onsite and in the greater Panoche Valley area are planned.

An approximately 5-acre substation is proposed as part of the project, and includes an adjacent area of up to 2 acres to be occupied by an OM facility, including a small parking area. One or more cement pads would be constructed as foundations for substation equipment, and other areas would utilize a gravel substrate. An 8-foot chain link fence would be constructed around the substation. These facilities would be strategically placed adjacent to the existing PG&E Moss to Panoche 230 kV transmission line. In addition to the substation and OM facility, there would be approximately one gear switch house for every 40 inverter and transformer combinations, each of which would have similar dimensions to the inverters and transformers.

2 EXISTING CONDITIONS

2.1 BIOTIC HABITATS ASSOCIATED WITH SECTION 16 OF TOWNSHIP 15S, RANGE 10E

Ruderal Grassland: At the time of the adult and juvenile BNLL surveys were conducted (3 May to 9 July, and 2 August to 10 September 2010, respectively), Section 16 the northeast corner of the site was used as a bull pen, and the remainder of the northern half of the Section was grazed in patches during juvenile survey. The southern half of the site was more heavily grazed during the adult surveys. The vegetation on-site included ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum ssp. leporinum*) and rat-tail fescue (*Vulpia myuros*). Dominant forbs included broad-leaved filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), shining peppergrass (*Lepidium nitidum var. nitidum*) and vinegarweed (*Tricostema lanceolatum*). Fiddleneck (*Amsinckia menziesii*), shepherds purse (*Capsella bursa-pastoris*), turkey mullein (*Eremocarpus setigerus*) and bur clover (*Medicago polymorpha*) were also common, especially along ranch roads. In general, the vegetation on the northern half of the Section was much more dense than on the southern half.

2.2 HISTORY OF BLUNT-NOSED LEOPARD LIZARDS WITHIN THE GREATER 4,885 ACRES OF THE SITE

The blunt-nosed leopard lizard (BNLL) is federally listed as Endangered (11 March 1967, Federal Register 32:4001); is state listed as Endangered (27 June 1971); and is also a Fully Protected species under California Fish and Game Code Section 5050. The California Natural Diversity Database (CNDDB) contains several observations of BNLL on the Valley floor dating between 1979 and 2004.

3 METHODS

The project site is within the known range of the BNLL. Therefore, surveys for adult and juvenile BNLL were conducted on Section 16 of Township 15S, Range 10E (Figure 1), which represents the initial area, or Phase I, of proposed development for the Panoche Valley Solar Farm. These surveys were conducted following the protocol outlined in CDFG's *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004, hereinafter referred to as CDFG Guidelines.

Survey Protocol Constraints:

The currently accepted survey methodology for the BNLL requires the following:

- The maximum width that survey transects can be spaced is 30 meters
- A maximum of 4 surveys on a given site per week and 8 days of surveys within a 30-day period. At least one survey session should be conducted for 4 consecutive days
- Surveys must be conducted within the following temperatures: 25°C-35°C (77°F – 95°F)
- No surveys on overcast days (cloud cover of >90%)
- No surveys when sustained wind velocities exceed 10 mph
- Surveys may begin after sunrise when temperatures are within appropriate ranges, but must end by 1400 hours or when maximum temperatures are reached
- Surveys must be conducted by a minimum of 2 biologists

Qualifications of Researchers:

An acceptable BNLL survey crew should consist of no more than 3 **Level I** researchers for every **Level II** researcher. This restriction should reduce the number of incorrect/missed identifications. The names and affiliations of all researchers must be recorded for each survey day.

- **Level l**: Researcher has demonstrated ability to distinguish BNLL from other common lizard species that may inhabit the area
- **Level II**: Researcher has demonstrated ability to distinguish BNLL from other common lizard species that may inhabit the area and has participated in at least 50 survey days for BNLL (or 25 survey days and a BNLL identification course recognized by/acceptable to the Department of Fish and Game). Researcher has made at least one confirmed field sighting of a BNLL
- A minimum of one confirmed field sighting must be documented for each **Level II** researcher and be available to the Department upon request. As with all BNLL sightings, it should also be submitted to the California Natural Diversity Database. The Information to be included in documentation of BNLL sighting include: Name of researcher, date of survey, location of survey, names of accompanying researchers who can confirm the sighting, and details of sighting (distance, BNLL activity, etc.)

LOA Level II biologists included: Dr. Mark Jennings, Molly Gobel, Yancey Bissonnette, Steve Pruett, Karl Weiss, Missy Chase, Jayanna Miller, Jared Prat and Lisa Wifrey. LOA Level I biologists included: Dan Cordova, Jen Turner, Fabian Pereida, Jared Bigler, Colby Boggs, Neal

Kramer, Chris Bronny, Wendy Fisher, Dave Wappler, Emily Cmapbe, Lidia D'Amico, Danielle Castle, Cecile Shohet, Andy Huck and Katrina Huck.

FIGURE 2 AREA SURVED

LOA conducted adult BNLL surveys, following the CDFG Guidelines, between 3 May and 9 July 2010. Young-of-the-year surveys were conducted between 2 August and 10 September 2010, again following CDFG Guidelines. The results of these surveys are summarized in Section 4 below.

4 RESULTS

Surveys for adult BNLL began on 3 May 2010 and were conducted most days, Monday through Friday, through 9 July 2010, weather permitting. Surveys for juvenile BNLL began on 2 August and ended 10 September 2010. As noted above, these surveys were conducted on Section 16 of Township 15S, Range 10E; the Section containing and Phase I of the proposed Panoche Valley Solar Farm. A total of 12 survey days were conducted during the adult surveys, and a total of 5 survey days were conducted for the juvenile surveys. The first adult BNLL was observed along Panoche Creek on 4 May 2010, the second day of surveys. A total of 12 adult surveys were conducted on Section 16 resulting in 37 observations of adult. Individual adult BNLL were observed throughout the survey window. Table 1 represents the dates and general location of BNLL observations during adult surveys, locations outside of Section 16 occurred outside of protocol parameters when surveyors walked the Panoche Creek wash.

Table 1. Dates and General Locations of Adult BNLL Observations (3 May to 9 July, 2010)

Date	Location*
4-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
7-May-2010	incidental along wash, Section 14
7-May-2010	incidental along wash, Section 14
7-May-2010	incidental along wash, Section 14
12-May-2010	On Southern Fence Row
12-May-2010	SE 1/4
13-May-2010	SE 1/4
13-May-2010	SE 1/4
13-May-2010	SE 1/4

14-May-2010	SW 1/4
14-May-2010	SW 1/4
14-May-2010	SE 1/4
19-May-2010	SE 1/4
25-May-2010	SE 1/4
25-May-2010	SE 1/4
25-May-2010	SE 1/4
5-Jun-2010	On Southern Fence Row
1-Jun-2010	SW 1/4
1-Jun-2010	SW 1/4
2-Jun-2010	SE 1/4
2-Jun-2010	SE 1/4
3-Jun-2010	SW 1/4
3-Jun-2010	SE 1/4
4-Jun-2010	SW 1/4
7-Jun-2010	SE 1/4
7-Jun-2010	SE 1/4
7-Jun-2010	SE 1/4
11-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
21-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
6-Jul-2010	SE 1/4

*All in Section 16 unless otherwise noted

Surveys for juvenile BNLL began on 2 August and continued until 10 September 2010. CDFG Guidelines call for a total of 5 complete surveys for juveniles, and Section 16 was surveyed 5 times following CDFG guidelines. The results were similar to the adult surveys, with BNLL being located in similar areas within Section 16 (i.e., in and around Panoche Creek). The dates and general locations of these observations can be seen in Table 2. Figure 2 graphically represents the general locations of select sightings.

Table 2. Dates and General Locations of Juvenile BNLL Observations (3 August - 1 September 2009)

Date	Location within Section 16
08/03/2010	SW 1/4
08/09/2010	SE 1/4
08/10/2010	SE 1/4-4 individuals
08/17/2010	SE 1/4
09/01/2010	SE 1/4

Other grassland species (e.g., BUOW and SJKF) continued to be observed and recorded during juvenile BNLL surveys. The general location and dates of observations are shown on Figure 2.

5 SUMMARY

Adult BNLL surveys were conducted on Section 16 of Township 15S, Range 10E of the proposed Panoche Valley Solar Farm between 3 May and 9 July2010; and juvenile BNLL surveys were conducted between 2 August and 10 September 2010. BNLL adult and juveniles were observed on Section 16.

The adult and juvenile BNLL found in Section 16 were found mainly in association with Panoche Creek, which is consistent with known habitat preferences of washes and floodplains (Warrick et al., 1998), and non-native grasslands (USFWS 1998), among others. Juvenile BNLL were found along the washes and also farther away as they dispersed from their hatching sites. Section 16 supports mid to dense vegetation one main wash. The grasses in the north portion of Section 16 was much more dense than the south portion, which may prove to be too dense to support BNLL populations.

6 REFERENCES

CDFG. 2009. California Natural Diversity Data Base. The Resources Agency, Sacramento, CA.

____. *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004

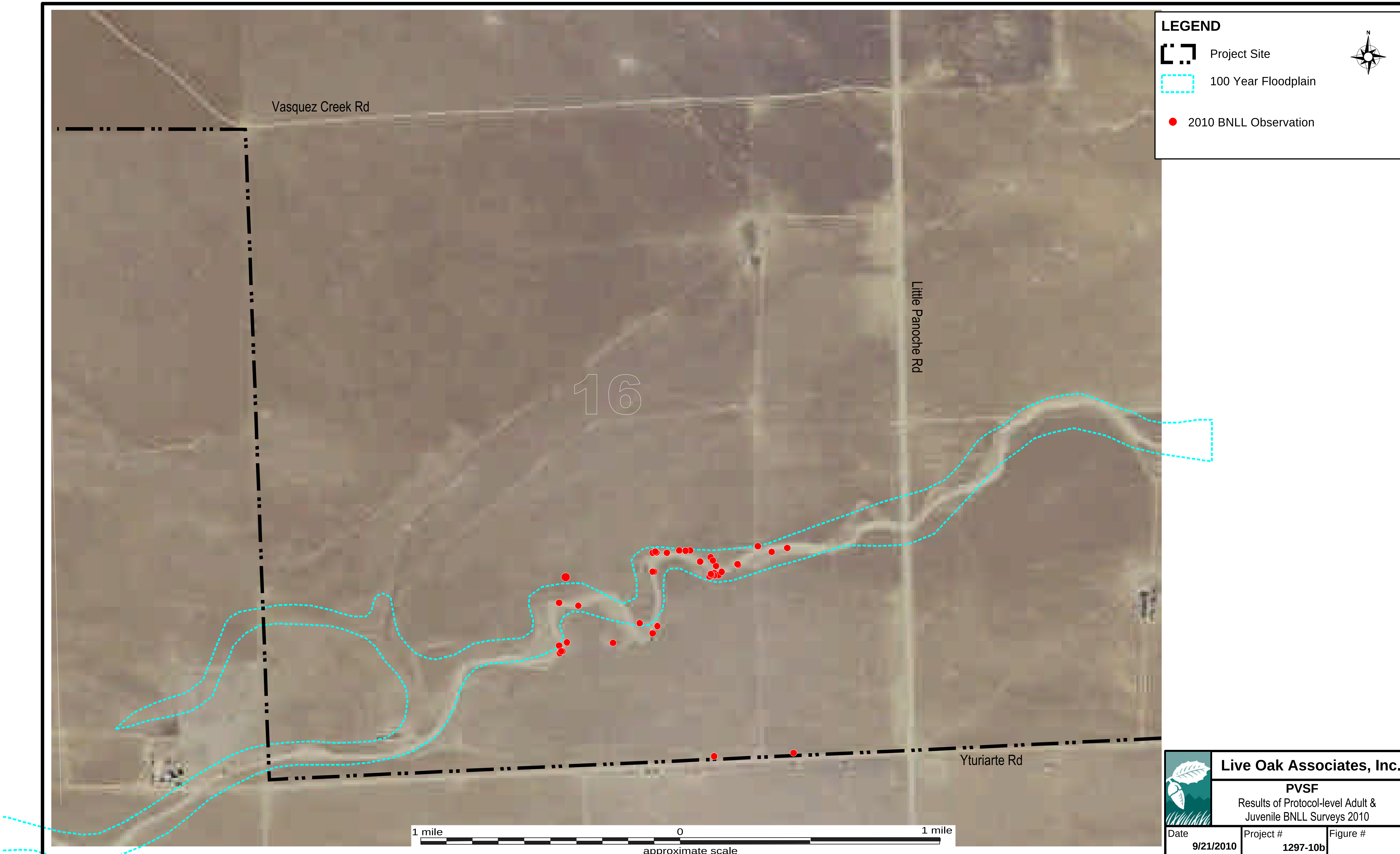
Germano, D.J. 2009. *The Number of Consensus Days Needed to Detect Blunt-Nosed Leopard Lizards*, Gambelia Sila. CDFG 95(2):106-109.

USFWS. 1998. *Recover Plan for Upland Species of the San Joaquin Valley, California*.

Warrick, G.D., T.T. Kato, B.R. Rose. 1998. *Microhabitat Use and Home Range Characteristics of Blunt-Nosed Leopard Lizards*. Journal of Herpetology, V32,N2,pp183-191.

APPENDIX A

APPENDIX B



Live Oak Associates, Inc.

PVSF

Results of Protocol-level Adult & Juvenile BNLL Surveys 2010

Date	Project #	Figure #
9/21/2010	1297-10b	

DATA REQUEST #8 – 10 September 2010

INTRODUCTION

Live Oak Associates, Inc. (LOA) conducted reconnaissance-level surveys on approximately 10,900-acres of the Silver Creek Ranch (SCR), proposed mitigation lands for the Panoche Valley Solar Farm (PVSF). These surveys were focused on blunt-nosed leopard lizards (*Gambelia sila*; BNLL), giant kangaroo rat (*Dipodomys ingens*; GKR) and San Joaquin kit fox (*Vulpes macrotis mutica*; SJKF). Observations of other species of special concern were also noted. Dr. Mark Jennings and Molly Goble conducted five days of BNLL surveys between 30 August and 3 September; Katrina and Andy Huck conducted three days of mammal surveys between 30 August and 1 September 2010; and Dr. Jim Paulus and Neal Kramer conducted three days of vegetation alliance surveys between 3 and 5 September 2010.

Each of these surveys began by visiting historic observations of relevant species as presented by the California Natural Diversity Database (CNDDB) and spot-checking those areas to determine whether they still support the species. To cover the most ground in the least amount of time, biologists drove as close as possible to historic sightings and then surveyed the areas on foot allowing the greatest amount of visual coverage. Subsequent efforts included other portions of the site that support suitable habitat for the target species. The following is a summary of effort for each segment of the reconnaissance survey.

SURVYES

<u>Vegetation Alliances</u>

Methods/Results

Map elements (vegetation alliances) identified within the study area were visited or viewed from nearby using binoculars. Boundaries between associations were drawn onto georectified 1:24,000 scale color aerial images during field reconnaissance. These polygons were then digitized to facilitate map interpretation. The typical total cover provided by the herbaceous, shrub and tree strata were observed, and a list of associations as signaled by shifts in dominant canopy species abundance was developed for each alliance present. A partial floristic inventory was conducted in concert with the mapping effort. Survey work included searching for extant riparian corridor or spring-driven habitat across the entire area. Observations of riparian habitat indicators such as surface flows, defined channels with evidence of scour, and phreatophytic species prominence were recorded. Due to the late timing of the surveys, potentially occurring rare plant species would be expected to be exhibiting late fruiting or senescing phenology, and so were past their optimal periods for identification. A table of special status plants with the potential to occur onsite is included at the end of this summary, as well as a partial inventory of plants onsite and a habitat map.

The three-day reconnaissance survey for plant alliances produced five distinct alliances. These alliances include California annual grassland, Ephedra californica shrubland, Populus fremontii forest, zonal riparian, and tamarix semi-natural shrubland (see Habitats map).

Blunt-nosed leopard lizard (*Gambelia sila*)

Methods/Results

General habitat and ocular surveys were conducted for BNLL and were concentrated where BNLL have been recorded in the past (in the CNDDB) and in those areas most likely to support BNLL habitat (e.g., barren washes and areas with sparse vegetation on friable soils). Two biologists walked abreast of one another no more than 30 meters apart, stopping from time to time and searching the surroundings through binoculars. The five days of surveys occurred within the juvenile survey period (1 August to 15 September) outlined in the CDFG's *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004 and generally followed the survey methodology. Observations of the target species and other species of special concern were mapped using a Garmin GPS unit.

Of the portions of the SCR that were surveyed, the highest quality habitat for BNLL appears to be in the lower portions of intermittent drainages near Panoche Road. The best habitats were in the SE corner of Section 27, the eastern half of Section 34, and the SW corner of Section 35. A total of 5 juvenile BNLL were observed in these areas (see Figure entitled: Silver Creek Recon BNLL3). The general habitat for all of these areas was sandy washes bordered by rocks and boulders with an abundance of California side-blotched lizards (*Uta stansburiana elegans*). The amount of vegetation present was sparse, especially for introduced grasses.

LOA did not find any juvenile BNLL in the portions of Section 32 (near center) and 35 (in the SE corner) previously recorded by the CNDDB. This could be due to the current presence of dense amounts of vegetation in the intermittent drainages there. Vegetation is almost certainly sparser during drought or below average rainfall years, or in years when these areas are more heavily grazed.

Giant Kangaroo Rat

Methods/Results

Surveys for GKR began in those areas with historic sightings (CNDDB) of the species (primary surveys), represented as polygons on the figure entitled: Silver Creek Recon GKR3; and secondary surveys were conducted in areas with a slope of 11% or less, which represents habitat most likely to support the target species, based on literature review and conversations with the Agencies. Spot-checking involved driving as near a polygon as possible, walking meandering transects and recording observations. Observations of the target species and other species of special concern were noted and mapped with a Trimble GPS unit. Due to some overlap in size class of scat between GKR and Heermann's kangaroo rat (*Dipodomys heermanni*) at 7mm, only rat scats $\geq$ 9mm were recorded as GKR. Possible locations of GKR were mapped as a polygon or a point depending on the amount of confirmed sign. The time constraints of the survey did not allow surveying of every CNDDB polygon. However, every CNDDB polygon that was surveyed (3 of 9) via spot-checking contained confirmed sign of GKR. A small valley, not previously recorded in the CNDDB supported a large colony of confirmed GKR sign (see GKR3).

San Joaquin kit fox

Methods/Results

Surveys for SJKF began in those areas with historic sightings (CNDDB) of the species (primary surveys), represented as polygons on the figure entitled: Silver Creek Recon SJKF3; and secondary surveys were conducted in areas with a slope of 11% or less, which represents habitat most likely to support the target species, based on literature review and conversations with the Agencies. Spot-checking involved driving as near a polygon as possible, walking meandering transects and recording observations. The CNDDB polygon encompassing Section 35 is still utilized by SJKF, confirmed by SJKF scat. The only other CNDDB polygons for SJKF on the SCR occur along Panoche Road, and are presumed to be data from previous road surveys or incidental sightings. LOA identified additional locations within the site containing SJKF scat. Five individuals were observed on the night of 1 September during spotlighting surveys from ranch roads within the site.

CONCLUSION

LOA conducted a brief reconnaissance survey of approximately 10,900-acres of the SCR focusing on vegetation alliances, BNLL, GKR and SJKF. Surveys began by spot-checking historic sightings of species as presented in the CNDDB and were conducted during the juvenile BNLL survey window. LOA confirmed that areas with historic observations of GKR and SJKF are still valid. While no observations of BNLL were made in areas with historic sightings, observations of 5 juvenile BNLL were made in the first two days of surveys in areas with no previous sightings, indicating a relatively healthy population, based on Germano's (CDFG 2009) findings that when the species is abundant it takes an average of 1.18 days of survey effort to observe.

In addition to the target species, a number of other special status species were observed including the San Joaquin coachwhip (*Masticophis flagellum ruddocki*), loggerhead shrike (*Lanius ludovicianus*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni;* SJAS), and American badger (*Taxidea taxus*). Observations of SJAS were initially being GPS'd, however they were so abundant across the site it became necessary to stop recording their locations due to a short survey window and so many acres to cover.

The site also supports potential breeding habitat for the California tiger salamander (*Ambystoma californiense*) in the form of stock ponds and vernal pools. Perennial waters in the Panoche Creek with covered by stands of cottonwood (*Populus fremontii*) could potentially support suitable habitat for California red-legged frog (*Rana draytonii*), especially considering the lack of predacious fish and bullfrogs in these waters.

The *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) and the *Blunt-nosed Leopard Lizard 5-Year Review Summary and Evaluation* (USFWS 2010) identified the SCR as a targeted area for protection and subsequent recovery of the suite of upland species occurring in the Panoche Valley and greater Ciervo-Panoche Region. Considering BNLL were not observed this year in areas where they were previously observed (CNDDB), likely due to the dense vegetation occurring there, there is an opportunity to manage the site to increase suitable habitat for BNLL. Opportunities to create breeding ponds for CTS are also likely present onsite. Eradicating tamarix from the drainages would increase biotic value on many levels.

Adding the SCR to the mitigation lands for the proposed PVSF would offer the entire Ciervo-Panoche Region an opportunity to protect already high quality habitat for the suite of upland species that occurs there and enhance habitat for the same species through restoration and adaptive management.

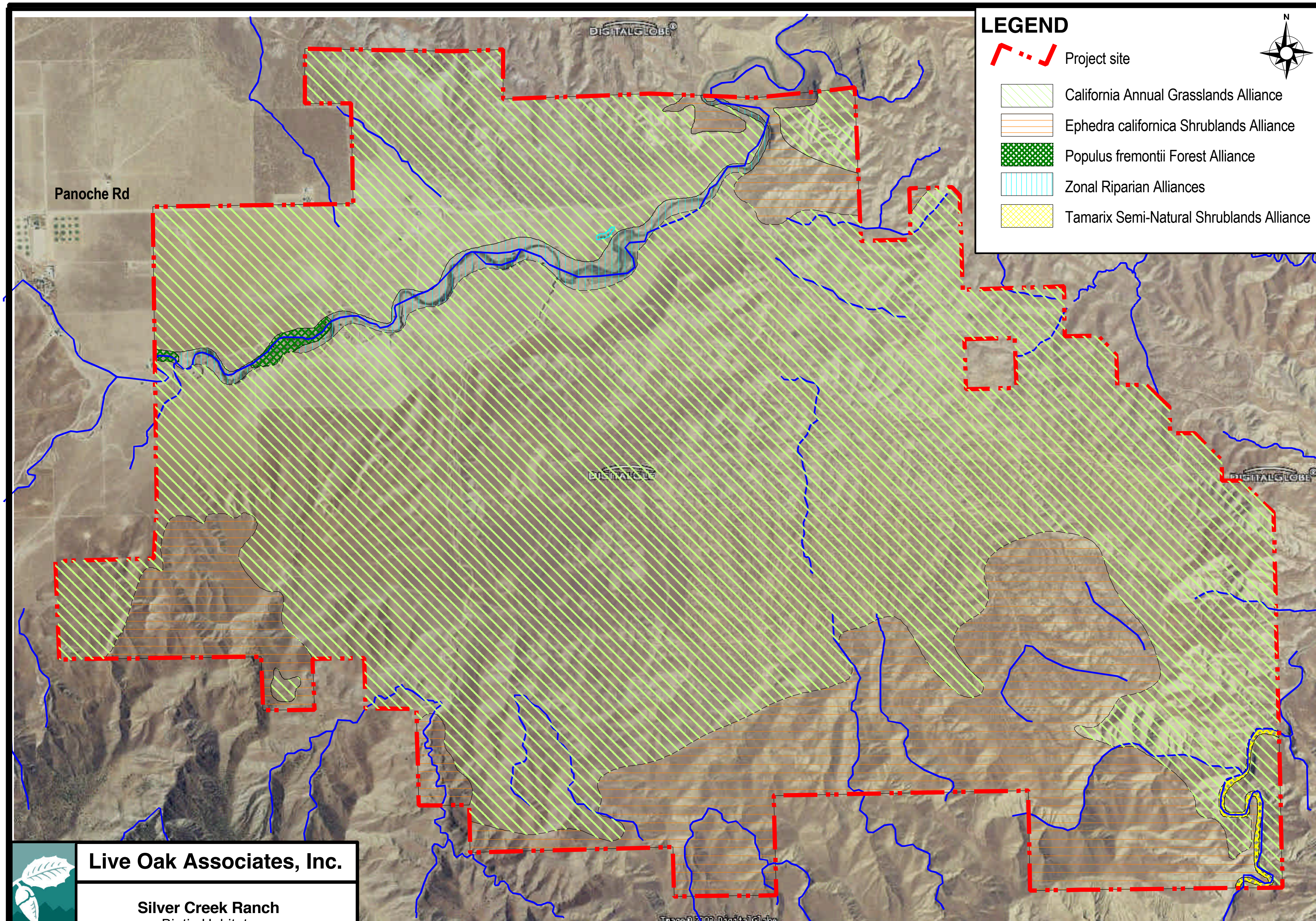
REFERENCES

CDFG. 2004. *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*.

Germano, D.J. 2009. *The Number of Consensus Days Needed to Detect Blunt-Nosed Leopard Lizards,* Gambelia Sila. CDFG 95(2):106-109.

USFWS. 1998. Germano, *Recovery Plan for Upland Species of the San Joaquin Valley, California*.

USFWS. 2010. Blunt-nosed Leopard Lizard (Gambelia Sila) 5-Year Review Summary and Evaluation.



Live Oak Associates, Inc.

Silver Creek Ranch
Biotic Habitats

Date	Project #	Figure #
9/09/2010	1297-13	2

1 mile 0 1 mile
approximate scale

Aerial photo courtesy of Digital Globe

Table 1. Special status plant species that could potentially occur within the 10,903 acre Silver Creek Ranch proposed Solargen Panoche Mitigation Area. Blooming period is taken from CNPS (2001).

Species	Status*	Habitat	Blooming Period
Santa Clara thorn-mint *Acanthomintha lanceolata* Annual herb	CNPS 4	Chaparral, woodland, rocky, often serpentine	March-June
forked fiddleneck *Amsinckia vernicosa* var. *furcata* Annual herb	CNPS 4	Woodland, grassland	February-May
Salinas milk-vetch *Astragalus macrodon* Perennial herb	CNPS 4	Chaparral, woodland, grassland	April-July
crownscale *Atriplex coronata* var. *coronata* Annual herb	CNPS 4	Chenopod scrub, grasslands, and vernal pools, alkaline soils	March-October
Lost Hills crownscale *Atriplex vallicola* Annual herb	CNPS 1B	Chenopod scrub, grasslands, and vernal pools, alkaline soils.	April-August
western lessingia *Benitoa occidentalis* Annual herb	CNPS 4	Chaparral, grassland, clay soils	May-November
round-leaved filaree *California macrophylla* Annual herb	CNPS 1B	Woodland, grassland	March-May
Lemmon's jewelflower *Caulanthus coulteri* var. *lemmonii* Perennial herb	CNPS 1B	Pinyon-juniper woodland, grassland	March-May
Hall's tarplant *Deinandra halliana* Annual herb	CNPS 1B	Chenopod scrub, grassland, clay soils	April-May
gypsum-loving larkspur *Delphinium gypsophilum* ssp. *gypsophilum* Perennial herb	CNPS 4	Chenopod scrub, grassland, clay soils	February-May

Table 1. (continued)

Species	Status*	Habitat	Blooming Period

recurved larkspur *Delphinium recurvatum* Perennial herb	CNPS 1B	Chenopod scrub, grassland, alkaline	March-June
protruding buckwheat *Eriogonum nudum* var. *indictum* Perennial herb	CNPS 4	Scrubland, woodland, often clay or serpentine	May-December
Temblor buckwheat *Eriogonum temblorense* Annual herb	CNPS 1B	Grasslands, open slopes	May-September
Idria buckwheat *Eriogonum vestitum* Annual herb	CNPS 4	Grasslands, open slopes	April-August
pale yellow layia *Layia heterotricha* Annual herb	CNPS 1B	Pinyon-juniper woodland, alkaline grassland, clay	March-June
Panoche peppergrass *Lepidium jaredii* ssp. *album* Annual herb	CNPS 1B	Grassland, washes and alluvial fans	February-June
serpentine leptosiphon *Leptosiphon ambiguus* Annual herb	CNPS 4	Grassland, often serpentine soil	March-June
showy golden madia *Madia radiata* Annual herb	CNPS 1B	Woodland, grassland	March-May
San Joaquin woollythreads *Monolopia congdonii* Annual herb	CNPS 1B federal Endangered	Chenopod scrub, grassland, sandy	February-May
chaparral ragwort *Senecio aphanactis* Annual herb	CNPS 2	Woodland, chaparral	January-April

***California Native Plant Society (CNPS) list designations**

1B: Plants Rare, Threatened, or Endangered in California and elsewhere
2: Plants Rare, Threatened, or Endangered in California but more common elsewhere
4: Plants of limited distribution – a watch list

Appendix A**.** Partial plant list developed during field verification of plant associations presen in the Solargen Panoche proposed Silver Creek Ranch mitigation area in September 2010. Nomenclature is taken from Hickman (1993) and Jepson Herbarium (2010). Wetland status is taken from Reed (1988). Status codes are given below.

Scientific Name	**Common Name**	**Wetland Status**
AGAVACEAE - Agave Family		
Hesperoyucca whipplei[1, 2]	Spanish bayonet	UPL
ALLIACEAE - Onion Family		
Allium crispum[2]	crinkled onion	UPL
APIACEAE - Carrot Family		
Lomatium utriculatum	common lomatium	UPL
ASTERACEAE - Sunflower Family		
Achillea millefolium	yarrow	FACU
Ambrosia acanthicarpa	annual bursage	UPL
Blepharizonia laxa[3]	big tarweed	UPL
*Centaurea melitensis**	tocalote	UPL
Chrysothamnus nauseosus	rabbitbrush	UPL
Deinandra kelloggii[4]	Kellogg's tarweed	UPL
Eastwoodia elegans	yellow mock aster	UPL
Ericameria linearifolia	interior/narrowleaf goldenbush	UPL
Euthamia occidentalis	western goldenrod	OBL
Gutierrezia californica	California matchweed	UPL
Helianthus annuus	common sunflower	FAC-
Isocoma acradenia var. *bracteosa*	alkali goldenbush	UPL
Iva axillaris ssp. robustior	poverty weed	FAC
*Lactuca saligna**	willow lettuce	NI*
*Lactuca serriola**	prickly lettuce	FAC
Lagophylla ramosissima[5]	common hareleaf	UPL
Lasthenia californica	common goldfields	UPL
Lessingia nemaclada	slenderstem lessingia	UPL
Micropus californicus var. *californicus*	slender cottonweed	UPL
Stephanomeria pauciflora	wire lettuce	UPL
Xanthium spinosum	spiny cocklebur	FAC+
Xanthium strumarium	cocklebur	FAC+
BORAGINACEAE - Borage Family		
Amsinckia menziesii	common fiddleneck	UPL
Amsinckia tessellata	checker fiddleneck	UPL
Heliotropium curassavicum	seaside/salt heliotrope	OBL
Phacelia tanacetifolia[6]	tansy phacelia	UPL
BRASSICACEAE - Mustard Family		
Lepidium nitidum var. *nitidum*	shining peppergrass	UPL
*Nasturtium officinale**	water cress	OBL
*Sisymbrium orientale**	oriental mustard	UPL
CARYOPHYLLACEAE - Pink Family		
Herniaria hirsuta var. *cinerea**	gray herniaria	UPL

Scientific Name	Common Name	Wetland Status
CHENOPODIACEAE - Goosefoot Family		
Atriplex argentea var. *mohavensis*	silverscale	FAC
Atriplex fruiticulosa	ball saltbush	
Atriplex lentiformis ssp. *lentiformis*	big saltbush	FAC
Atriplex polycarpa	allscale, desert saltbush	UPL
*Bassia hysopifolia**	fivehorn smotherweed	FAC
*Salsola tragus**	Russian thistle, tumbleweed	FACU
CUPRESSACEAE - Cypress Family		
Juniperus californica	California juniper	UPL
CYPERACEAE - Sedge Family		
Bolboschoenus maritimus[7]	saltmarsh bulrush	OBL
Eleocharis montevidensis	sand spikerush	FACW
Schoenoplectus americanus[8]	three square	OBL
Schoenoplectus pungens[9]	common threesquare	OBL
EPHEDRACEAE - Ephedra Family		
Ephedra californica	California ephedra, Mormon tea	UPL
EUPHORBIACEAE - Spurge Family		
Chamaesyce ocellata ssp. *ocellata*	Contura Creek sandmat	UPL
Croton setigerus[10]	turkey mullein, dove weed	UPL
FABACEAE - Legume Family		
Acacia greggii	catclaw	FACU
Astragalus didymocarpus var. *didymocarpus*	dwarf white milkvetch	
Astragalus oxyphysus	Mt. Diablo milkvetch	UPL
*Lotus corniculatus**	bird's foot trefoil	FAC
Lotus wrangelianus	California lotus	UPL
Lupinus microcarpus	chick lupine	UPL
*Medicago polymorpha**	burclover	UPL
*Melilotus indicus**	sour clover, small melilot	FAC
Prosopis glandulosa var. *torreyana*	mesquite	FACU
Trifolium willdenovii	tomcat clover	UPL
FRANKENIACEAE - Frankenia Family		
Frankenia salina	alkali heath	FACW+
GERANIACEAE - Geranium Family		
*Erodium cicutarium**	red-stemmed filaree	UPL
JUNCACEAE - Rush Family		
Juncus mexicanus	Mexican rush	FACW
Juncus ensifolius	dagger rush	FACW
Juncus xiphioides	iris-leaved rush	OBL
LAMIACEAE - Mint Family		
Salvia carduacea	thistle sage	UPL
Salvia columbariae	chia	UPL
Trichostema lanceolatum	vinegarweed	UPL

Scientific Name	Common Name	Wetland Status
ONAGRACEAE - Evening primrose Family		
Camissonia boothii ssp. *decorticans*	shredding primrose	UPL
Clarkia unguiculata	elegant clarkia	UPL
PLANTAGINACEAE - Plantain Family		
Plantago erecta	California plantain	UPL
POACEAE - Grass Family		
*Avena barbata**	slender wild oat	UPL
*Bromus diandrus**	ripgut brome	UPL
*Bromus hordeaceus**	soft chess	FACW-
Bromus madritensis ssp. *rubens**	foxtail chess, red brome	UPL
Distichlis spicata	saltgrass	FACW*
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley	FAC
Hordeum murinum ssp. *leporinum**	foxtail barley	NI
*Koeleria phleoides**	annual junegrass	
Leymus triticoides	alkali ryegrass	FAC+
Muhlenbergia asperifolia	scratch grass	FACW
Poa secunda ssp. *secunda*	one-sided bluegrass	UPL
*Polypogon monspeliensis**	rabbit's foot grass	FACW+
Vulpia microstachys	annual fescue	UPL
*Vulpia myuros var. myuros**	rat-tail fescue	FACU*
POLEMONIACEAE - Phlox Family		
Eriastrum pluriflorum	manyflowered woollystar	UPL
POLYGONACEAE - Buckwheat Family		
Chorizanthe uniaristida	one-awned spineflower	UPL
Eriogonum angulosum	anglestem buckwheat	UPL
Eriogonum fasciculatum var. *polifolium*	California buckwheat	UPL
Eriogonum gracile var. *gracile*	slender woolly buckwheat	UPL
Eriogonum nudum var. *indictum*	protruding buckwheat	UPL
Hollisteria lanata		UPL
Lastarriaea coriacea	leather spineflower	UPL
Mucronea perfoliata	perfoliate spineflower	UPL
*Rumex stenophyllus**	narrowleaf dock	NI
RANUNCULACEAE - Buttercup Family		
Delphinium sp.	larkspur	UPL
SALICACEAE - Willow Family		
Populus fremontii ssp. *fremontii*	Fremont cottonwood	FACW
Salix exigua	narrow-leaved willow	OBL
Salix laevigata	red willow	~NI
SOLANACEAE - Nightshade Family		
*Nicotiana glauca**	tree tobacco	FAC
Nicotiana quadrivalvis	indian tobacco	UPL
TAMARICACEAE - Tamarisk Family		
*Tamarix ramosissima**	saltcedar	FAC
TYPHACEAE - Cattail Family		
Typha latifolia	broadleaf cattail	OBL

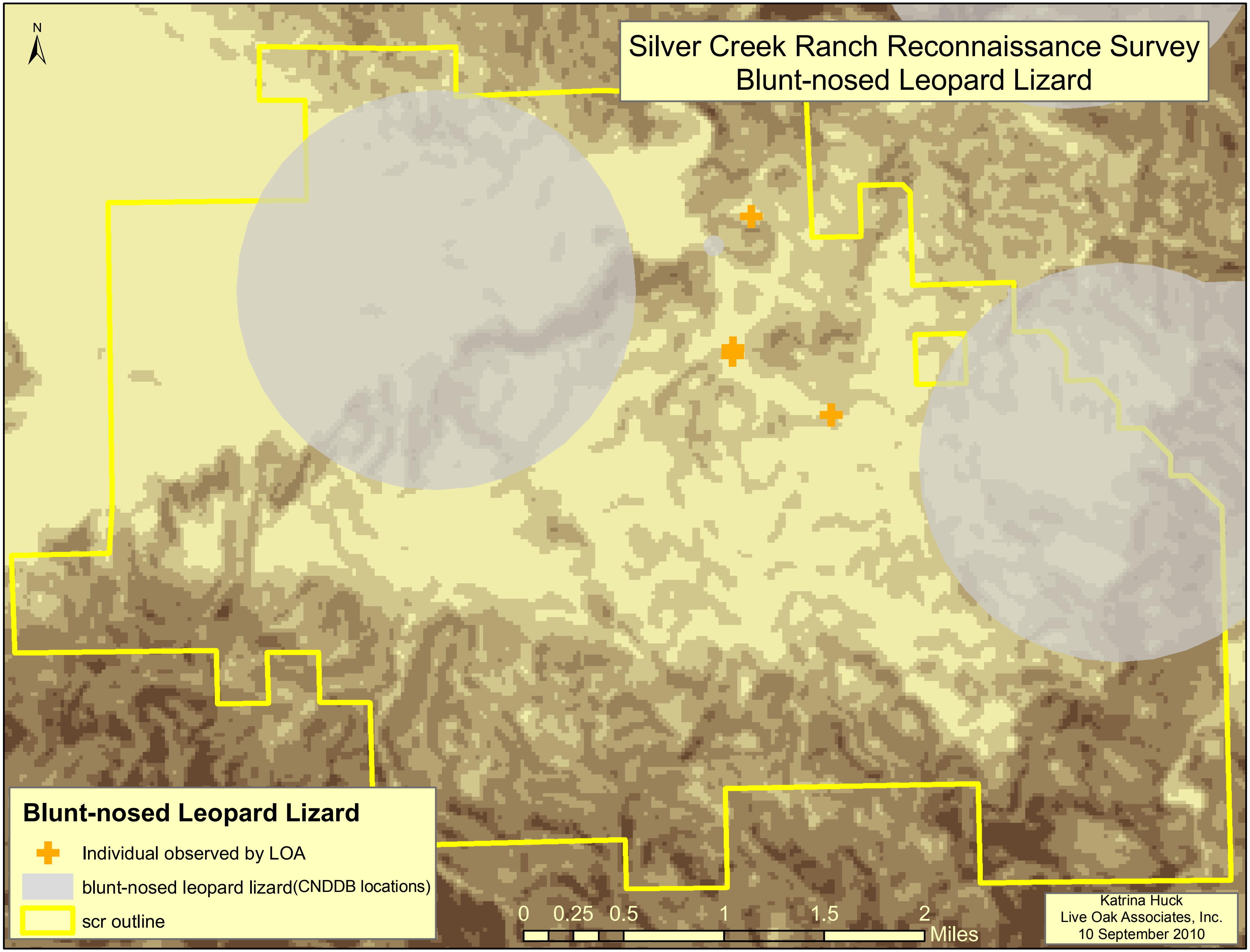
Scientific Name	Common Name	Wetland Status
VISCACEAE - Mistletoe Family		
Phoradendron serotinum ssp. *macrophyllum*[11]	bigleaf mistletoe	UPL
ZANNICHELLIACEAE - Horned-Pondweed Family		
Zannichellia palustris	horned-pondweed	OBL
ZYGOPHYLLACEAE - Caltrop Family		
*Tribulus terrestris**	punture vine	UPL

* Indicates introduced non-native species.

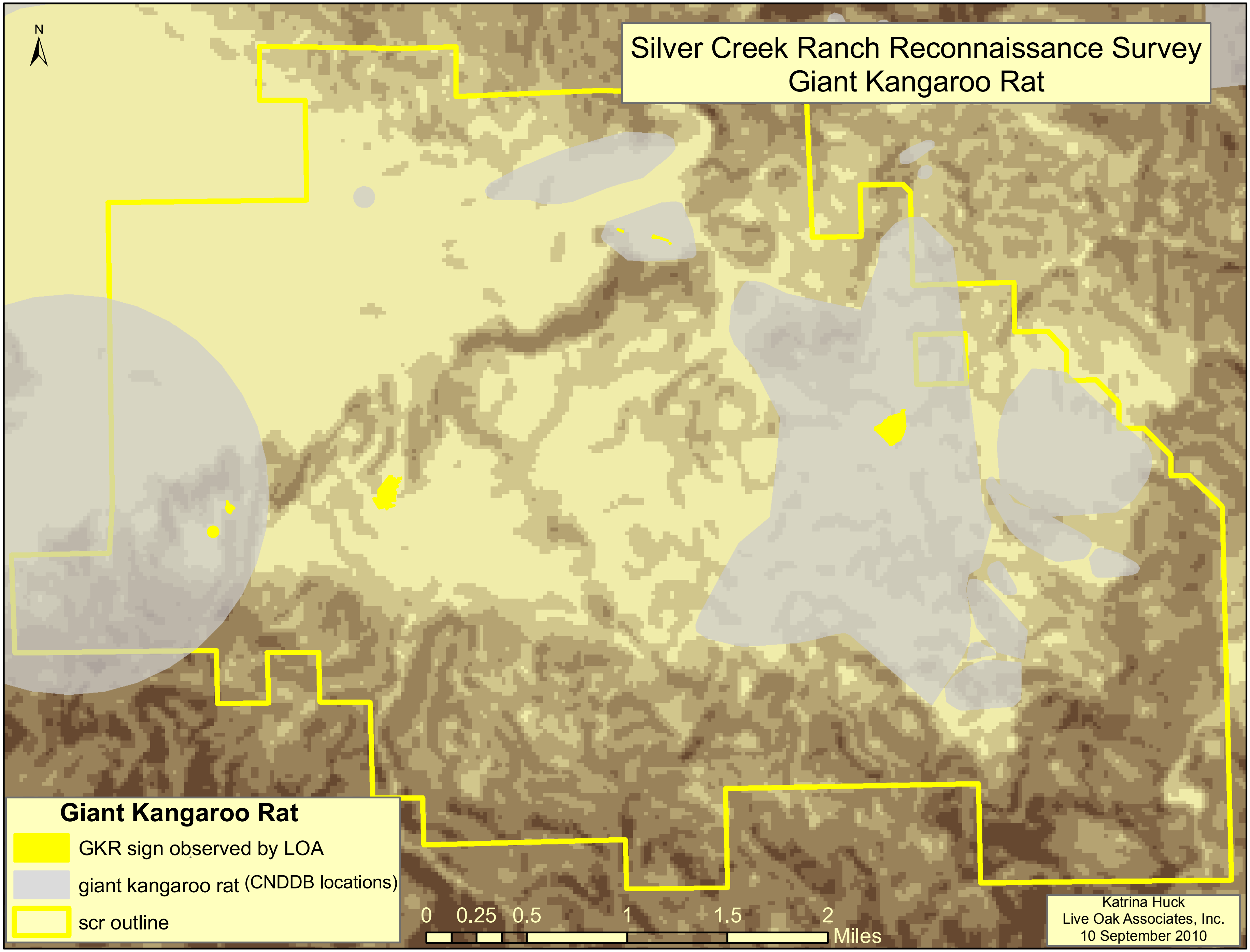
Key to the U.S. Fish and Wildlife wetland indicator status abreviations:

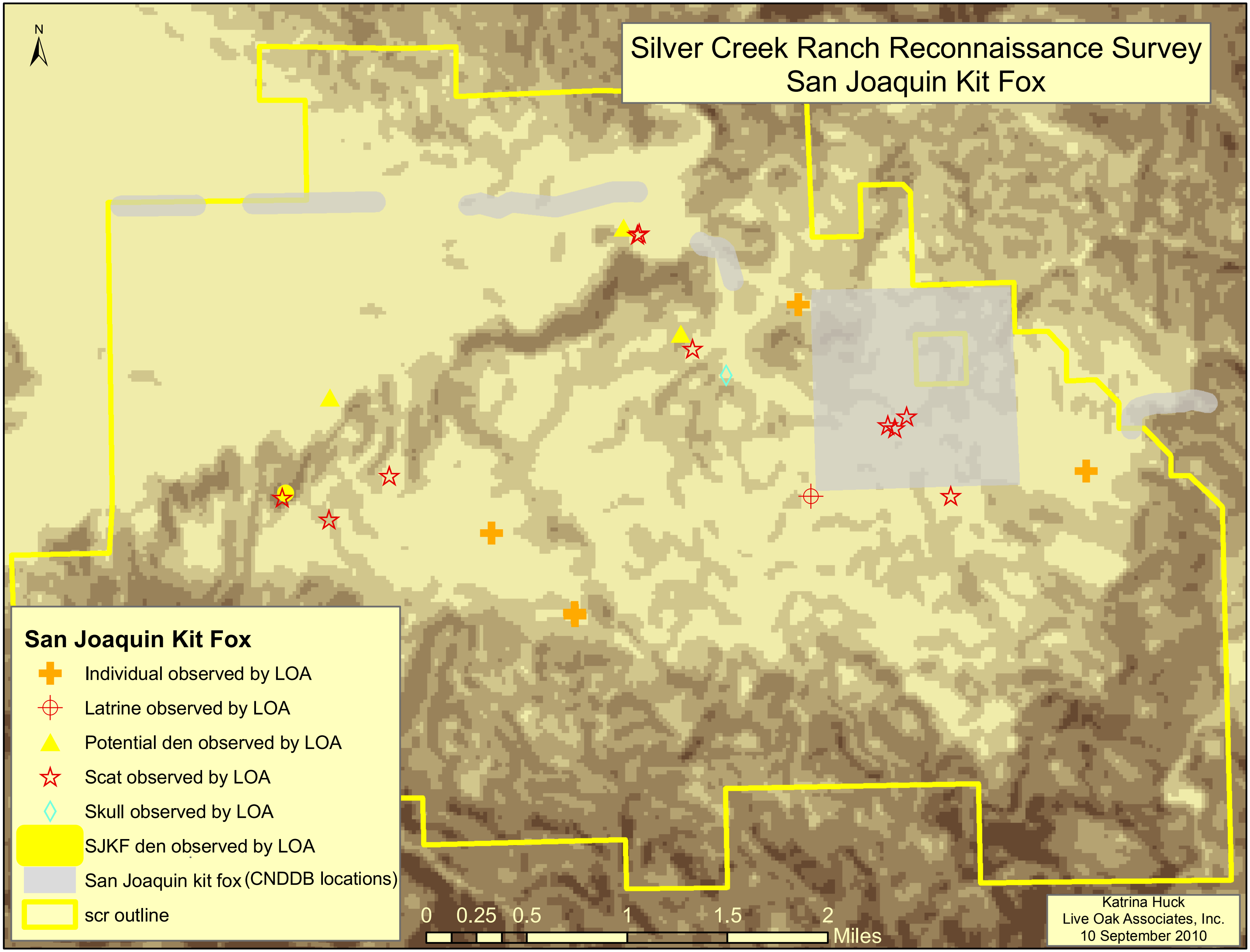
OBL - obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
+/- - indicates High or Low end of category.
NI - No investigation

1 syn. *Yucca whipplei*
2 formerly included in family Liliaceae
3 syn. *Blepharizonia plumosa* ssp. *viscida*
4 syn. *Hemizonia kelloggii*
5 syn. *Lagophylla ramossissima* ssp. *ramosissima*
6 formerly included in family Hydrophyllaceae
7 syn. *Scirpus maritimus*
8 syn. *Scirpus americanus*
9 syn. *Scirpus pungens*
10 syn. *Eremocarpus setigerus*
11 syn. *Phoradendrom macrophyllum*

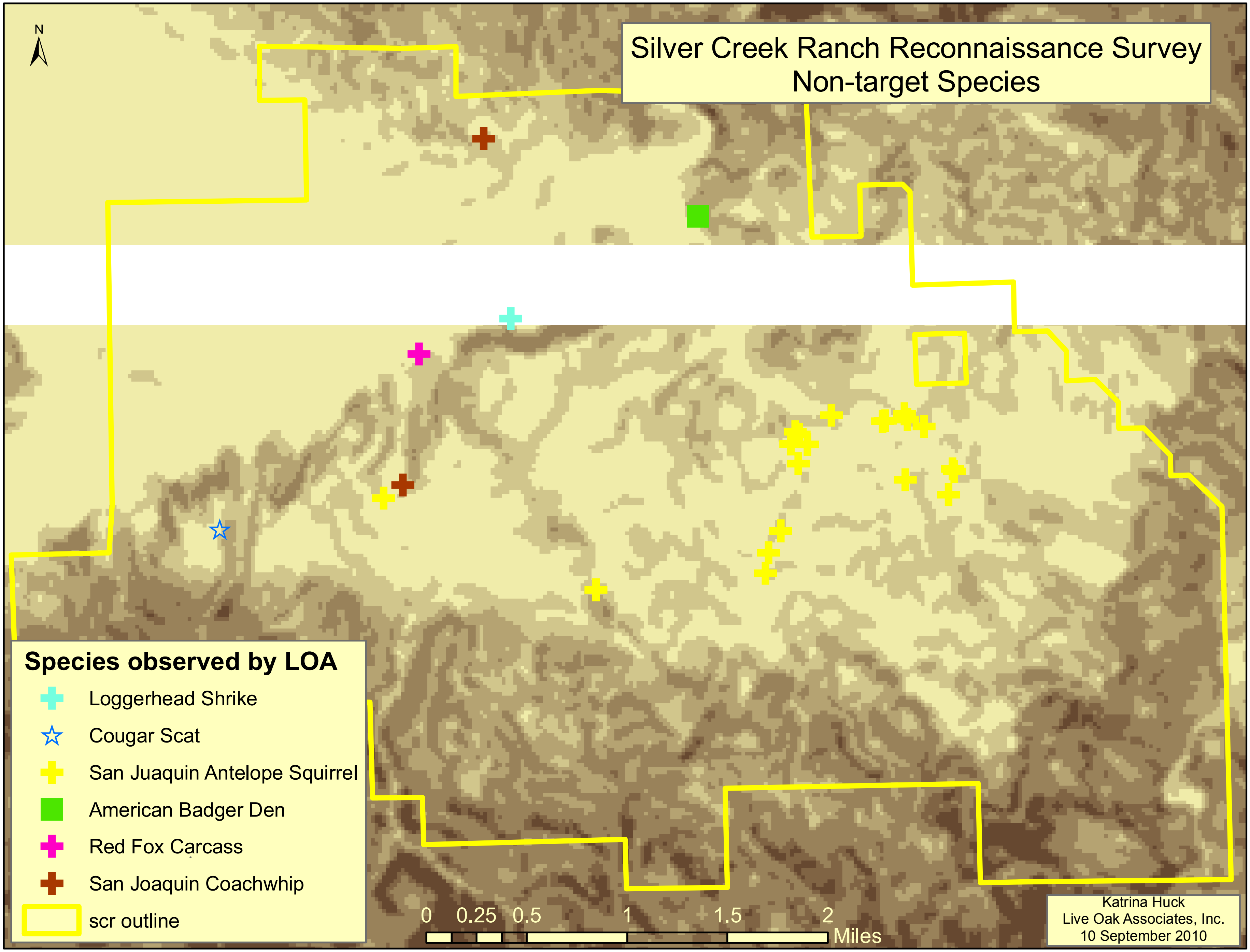


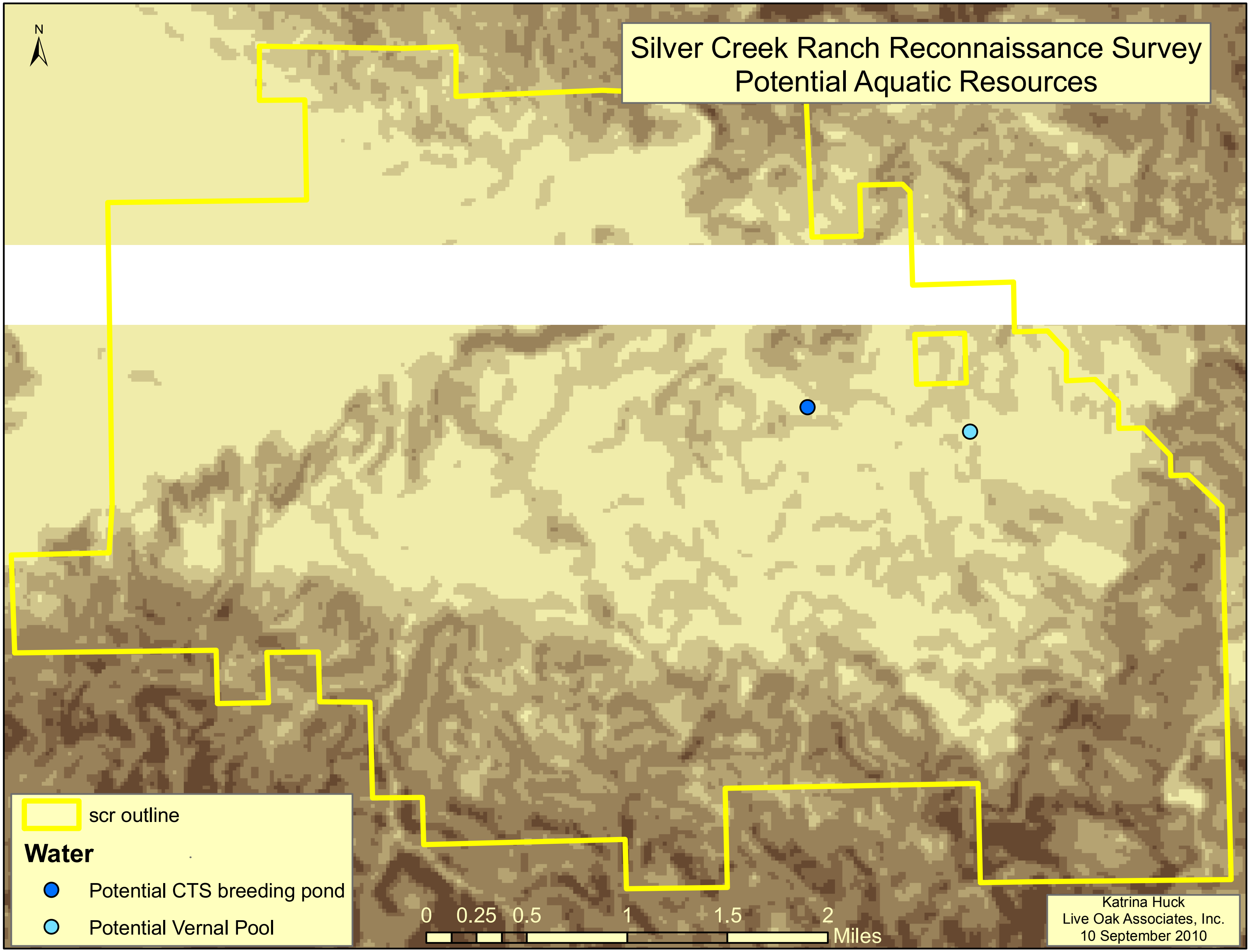
N
Silver Creek Ranch Reconnaissance Survey
Blunt-nosed Leopard Lizard
Blunt-nosed Leopard Lizard
Individual observed by LOA
blunt-nosed leopard lizard(CNDDB locations)
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


N
Silver Creek Ranch Reconnaissance Survey
Giant Kangaroo Rat
Giant Kangaroo Rat
GKR sign observed by LOA
giant kangaroo rat (CNDDB locations)
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010



N
Silver Creek Ranch Reconnaissance Survey
San Joaquin Kit Fox
San Joaquin Kit Fox
Individual observed by LOA
Latrine observed by LOA
Potential den observed by LOA
Scat observed by LOA
Skull observed by LOA
SJKF den observed by LOA
San Joaquin kit fox (CNDDB locations)
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


Silver Creek Ranch Reconnaissance Survey
Non-target Species
N
Species observed by LOA
Loggerhead Shrike
Cougar Scat
San Juaquin Antelope Squirrel
American Badger Den
Red Fox Carcass
San Joaquin Coachwhip
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010



N
Silver Creek Ranch Reconnaissance Survey
Potential Aquatic Resources
scr outline
Water
Potential CTS breeding pond
Potential Vernal Pool
0
0.25
0.5
1
1.5
2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Species Account

BLUNT-NOSED LEOPARD LIZARD

Gambelia sila

CLASSIFICATION: Endangered
Federal Register 32:4001; March 11, 1967
http://ecos.fws.gov/docs/federal_register/fr18.pdf (PDF)
The blunt-nosed leopard lizard was listed as *Crotaphytus wislizenii silus*. In 1975, it was moved to the genus *Gambelia* as a full species, *Gambelia silus*. More recently, the *specific* name was changed to *sila* to match the gender of the genera name.


Blunt-Nosed Leopard Lizard
Adam Zerrenner, USFWS

STATE LISTING STATUS: The blunt-nosed leopard lizard was listed as endangered by the State of California in 1971.

CRITICAL HABITAT: None designated

RECOVERY PLAN: Final
Recovery plan for the upland species of the San Joaquin Valley, California
http://ecos.fws.gov/docs/recovery_plan/980930a.pdf (PDF)

5-year review: Completed February 2010. No change was recommended.
http://www.fws.gov/ecos/ajax/docs/five_year_review/doc3209.pdf (1 MB)
September 30. 1998

DESCRIPTION:

The blunt-nosed leopard lizard (Gambelia silus) is a relatively large lizard the Iguanidae family. It has a long, regenerative tail, long, powerful hind limbs, and a short, blunt snout. Adult males are slightly larger than females, ranging in size from 3.4 to 4.7 inches in length, excluding tail. Females are 3.4 to 4.4 inches long. Males weigh 1.3 to 1.5 ounces, females 0.8 to 1.2.

Blunt-nosed leopard lizards feed primarily on insects (particularly grasshoppers, crickets and moths), other lizards and occasionally plant material.

Although blunt-nosed leopard lizards are darker than other leopard lizards, they exhibit tremendous variation in color and pattern on their backs. Their background color ranges from yellowish or light gray-brown to dark brown, depending on the surrounding soil color and vegetation. Their undersides are uniformly white. They have rows of dark spots across their backs, alternating with white, cream-colored or yellow bands. See the Recovery Plan for more details about identification.

Males are highly combative in establishing and maintaining territories. Male and female home ranges often overlap. The mean home range size varies from 0.25 to 2.7 acres for females and 0.52 to 4.2 acres for males. Density estimates range from 0.1 to 4.2 lizards per acre. Population densities in marginal habitat generally do not exceed 0.2 blunt-nosed leopard lizards per acre. There are no current overall population size estimates for the species.

Breeding activity begins within a month of emergence from dormancy and lasts from the end of April to the end of June. Male territories may overlap those of several females, and a given male may mate with several females. Two to six eggs are laid in June and July, and their numbers are correlated with the size of the female. Under adverse conditions, egg-laying may be delayed one or two months, or reproduction may not occur at all.

Females typically produce only one clutch of eggs per year. But some may produce three or more under favorable environmental conditions. After about two months of incubation, young hatch from late July through early August, rarely to September.

Seasonal above ground activity is correlated with weather conditions, primarily temperature. Lizards are most active on the surface when air temperatures are between 74° and 104° F, with surface soil temperatures between 72° and 97°. Smaller lizards and young have a wider activity range than the adults.

Leopard lizards use small rodent burrows for shelter from predators and temperature extremes. Burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels. Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. In areas of low mammal burrow density, lizards will construct shallow, simple tunnels in earth berms or under rocks.

Potential predators are numerous. They include snakes, predatory birds and most carnivorous valley mammals. Blunt-nosed leopard lizards themselves feed primarily on insects (mostly grasshoppers, crickets and moths) and other lizards.

DISTRIBUTION:

This species is found only in the San Joaquin Valley and adjacent foothills, as well as the Carrizo Plain and Cuyama Valley. It inhabits open, sparsely vegetated areas of low relief on the valley floor and the surrounding foothills. It also inhabits alkali playa and valley saltbush scrub. In general, it is absent from areas of steep slope, dense vegetation, or areas subject to seasonal flooding.

Although the boundaries of its original distribution are uncertain, the species probably ranged from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south, and from the Coast Range mountains, Carrizo Plain and Cuyama Valley in the west to the foothills of the Sierra Nevada in the east.

The currently occupied range consists of scattered parcels of undeveloped land on the Valley floor, most commonly annual grassland and valley sink scrub. See 5-year review (above) for details.

THREATS:

Habitat disturbance, destruction and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Stebbins first recognized, in 1954, that agricultural conversion of its habitat was causing the extirpation of the blunt-nosed leopard lizard.

Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. However, light or moderate grazing may be beneficial, unlike cultivation of row crops, which precludes use by leopard lizards.

Direct mortality occurs when animals are killed in their burrows during construction, killed by vehicle traffic, drowned in oil, or fall into excavated areas from which they are unable to escape. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization.

The use of pesticides may directly and indirectly affect blunt-nosed leopard lizards. The insecticide Malathion has been used since 1969 to control the beet leafhopper, and its use may reduce insect prey populations. Fumigants, such as methyl bromide, are used to control ground squirrels. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned. Visit the California Dept. of Pesticide Regulation Endangered Species Project web page for more information.

Cultivation, petroleum and mineral extraction, pesticide applications, off-road vehicle use, and construction of transportation, communication, and irrigation infrastructures collectively have caused the reduction, fragmentation of populations and decline of blunt-nosed leopard lizards.

REFERENCES FOR ADDITIONAL INFORMATION:

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Thelander, C. ed. 1994. Life on the edge: a guide to California's endangered natural resources. BioSystem Books. Santa Cruz, CA. p 272-273.

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Last updated: May 28, 2010

Blunt-nosed leopard lizard
(*Gambelia sila*)

5-Year Review:
Summary and Evaluation

T. Kuhn, U.S. Fish and Wildlife Service 2009

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Sacramento, California
February 2010

5-YEAR REVIEW

Blunt-nosed leopard lizard
(*Gambelia sila*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. The blunt-nosed leopard lizard was listed as endangered under the Endangered Species Preservation Act in 1967, and was not subject to the current listing processes and, therefore, did not include an analysis of threats to the lizard. However, a review of Federal and State agency materials and scientific publications written at or near the time of listing indicates that listing was in fact based on the existence of threats that would be attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley of central California (Stejneger 1893; Smith 1946; Montanucci 1965, 1970; Tollestrup 1979a). This species typically inhabits open, sparsely vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills (Smith 1946; Montanucci 1965). Holland (1986) described the vegetative communities that blunt-nosed leopard lizards are most commonly found in as Nonnative Grassland and Valley Sink Scrub communities. Other suitable habitat types on the Valley floor for this species include Valley Needlegrass Grassland (Holland 1986), Alkali Playa (Holland 1986), and Atriplex Grassland (Tollestrup 1976).

The species is a relatively large lizard in the Iguanidae family with a long, regenerative tail; long, powerful hind limbs; and a short, blunt snout (Smith 1946; Stebbins 1985). Though their under surface is uniformly white, the species exhibits tremendous variation in color and pattern on the back (Tanner and Banta 1963; Montanucci 1965, 1970), ranging from yellowish or light gray-brown to dark brown. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches (Tollestrup 1982) and weigh between 0.8 and 1.5 ounces (Uptain *et al.* 1985). Blunt-nosed leopard lizards use small rodent burrows for shelter from predators and temperature extremes (Tollestrup 1979b). Burrows are usually abandoned ground squirrel

(*Spermophilus beecheyi*) tunnels, or occupied or abandoned kangaroo rat tunnels (*Dipodomys* spp.) (Montanucci 1965). Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. Montanucci (1965) found that in areas of low mammal burrow density, lizards would construct shallow, simple tunnels in earth berms or under rocks. Blunt-nosed leopard lizards feed primarily on insects (mostly grasshoppers, crickets, and moths) and other lizards, although some plant material is rarely eaten or, perhaps, unintentionally consumed with animal prey. They appear to feed opportunistically on animals, eating whatever is available in the size range they can overcome and swallow.

I.A. Methodology used to complete the review: This review was prepared by a staff biologist for the Sacramento Fish and Wildlife Office (Service). This review is based on the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980), the *Revised Blunt-Nosed Leopard Lizard Recovery Plan* (Service 1985), the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) (Service 1998), as well as published literature, agency reports, biological opinions, completed and draft Habitat Conservation Plans (HCPs), unpublished data, and interviews with species experts. No previous status reviews for this species have been conducted. Due to the lack of a threats analysis within the 1967 listing (32 **FR** 4001), this 5-year review contains updated information on the species' biology and threats, and an assessment of that information since the time that 1980 Recovery Plan was drafted. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes this available information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

I.B. Contacts

Lead Regional Office –Diane Elam, Deputy Division Chief for Listing, Recovery and Habitat Conservation Planning, Region 8, Pacific Southwest Regional Office, (916) 414-6464

Lead Field Office – Kirsten Tarp, Recovery Branch, Sacramento Fish and Wildlife Office, Region 8, (916) 414-6600

Cooperating Field Office: Mike McCrary, Ventura Fish and Wildlife Office, Region 8, (805) 644-1766

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: 71 **FR** 16584, April 3, 2006. We did not receive any information in response to our request for information.

I.C.2. Listing history

Original Listing
FR notice: 32 **FR** 4001
Date listed: March 11, 1967*
Entity listed: Species – Blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*)
Classification: Endangered
***Note: Listing documents at this time did not use the 5 factor analysis method, and did not provide discussion of status and threats.

I.C.3. Species' Recovery Priority Number at start of review: 2C

The Recovery Priority Number for the blunt-nosed leopard lizard is 2C. This Number reflects a high degree of threat, a high recovery potential, and a taxonomic rank of full species (Service 1983). The "C" indicates conflict with construction or other development projects or other forms of economic activity. This determination results from continued degradation and fragmentation of its habitat, perceived and realized threats to extant populations, and the potential for recovery of the species.

I.C.4. Recovery Plan or Outline

Name of plan:	Recovery Plan for Upland Species of the San Joaquin Valley, California
Date issued:	September 30, 1998
Dates of Previous Revisions:	Recovery Plan Blunt-Nosed Leopard Lizard (Service 1980), and Revised Blunt-Nosed Leopard Lizard Recovery Plan (Service 1985)

II. REVIEW ANALYSIS

II.A. Application of the 1996 Distinct Population Segment (DPS) policy

II.A.1. Is the species under review listed as a DPS?

____ ***Yes***
__X_ ***No***

II.A.2. Is there relevant new information for this species regarding the application of the DPS policy?

____ ***Yes***
__X_ ***No***

II.B. Recovery Criteria

II.B.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Yes***
_____ ***No***

II.B.2. Adequacy of recovery criteria.

II.B.2.a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

__X_ ***Yes***
_____ ***No***

II.B.2.b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

_____ ***Yes***
__X__ **No**

II.B.3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors[*] are addressed by that criterion.

The downlisting and delisting criteria for the blunt-nosed leopard lizard in the Recovery Plan are described below. Listing Factor B is not considered relevant to this species.

<u>*Downlisting Criteria*</u>
Reclassification to threatened status should be evaluated when the species is protected in specified recovery areas from incompatible uses, management plans have been approved and implemented for recovery areas that include survival of the species as an objective, and population monitoring indicates that the species is stable. Downlisting criteria include:

1) *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, including one each on (addresses Listing Factor A):*
    A) *Valley floor in Merced or Madera Counties;*
    B) *Valley floor in Tulare or Kern Counties;*
    C) *Foothills of the Ciervo-Panoche Natural Area;*

A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Overutilization for commercial, recreational, scientific, or educational purposes;
C) Disease or predation;
D) Inadequacy of existing regulatory mechanisms;
E) Other natural or manmade factors affecting its continued existence.

D) *Foothills of western Kern County; and*
E) *Foothills of the Carrizo Plain Natural Area.*

2) *Management Plan approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective (addresses Listing Factor C and E).*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards 1 per acre through one precipitation cycle (addresses Listing Factor E).*

A brief discussion of each downlisting criterion for the blunt-nosed leopard lizard is presented in the text below, and further abbreviated in Table 1. Appendix A presents detailed information used for analysis of these downlisting criteria in this review, including the level of protection for each of the recovery areas, land management plan status for these areas, and the mean density and stability of blunt-nosed leopard lizard populations. Figures 1 and 2 illustrate the location of known blunt-nosed leopard lizard occurrences reported in the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) (CNDDB 2006) and the location of large preserves within the range of the blunt-nosed leopard lizard.

1. *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, as follows:*

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each of about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 to 640-acre parcels. Within the Ciervo-Panoche Natural Area, two Areas of Critical Environmental Concern (ACEC), separated by 2 miles, protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. The ACEC designation is the highest level of protection that the BLM (under Federal Lands Policy and Management Act) can assign to an area; with this designation, the BLM is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, including fish and wildlife resources. Within the foothills of western Kern County, the Occidental Petroleum Ltd. (Oxy), conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area, but not in the four other specified recovery areas.

Notably, through the development of a draft HCP for Chevron USA, Inc. (Chevron), lands in the *Lokern Natural Area*, and a draft HCP for Oxy of Elk Hills lands in the *Foothills of western Kern County*, the downlisting criterion is expected to also be met for these two areas in the foreseeable future. The draft Chevron Lokern HCP (G. Scott, Chevron, pers. comm. 2006) proposes to protect an additional 11,143 acres in the Lokern area. Thus, in total, approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. Similarly, the Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) proposes to preserve roughly 38,780 acres of the Naval Petroleum Reserve-1 (NPR-1). Nonetheless, for the purposes of this review, until these HCPs are completed and an incidental take permit for the proposed activities is issued, the habitat protection associated with the proposed HCP remains uncertain.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern National Wildlife Refuge (NWR); Pixley NWR; the Center for Natural Lands Management (CNLM) lands at Semitropic Ridge Preserve; the CNLM, Plains Exploration & Production Company (PXP), and Bureau of Land Management (BLM) lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM, the Nature Conservancy, and CDFG lands of the Carrizo Plain National Monument; the Coles Levee Ecological Preserve (CLEP); and Kern Water Bank (KWB) Conservation Lands. Whereas, management plans have not been developed for the remaining specified protected areas including: Merced and/or Madera Counties; CDFG lands on the *Semitropic Ridge Preserve;* CDFG and Oxy Lands (outside of the Elk Hills Conservation Area) on the Lokern Natural area; Ciervo-Panoche Natural Area; and, NPR-2. Notably, the management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion for the approval and implementation of management plans in all protected areas is partly achieved.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*[1]

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004; Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005; Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley National Wildlife Refuge (NWR; Williams *in litt.* 2006), Buttonwillow Ecological Reserve (ER), Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). Long-term population studies have not been conducted for blunt-nosed leopard lizards in the Cuyama Valley, the Ciervo-Panoche Natural Area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

[1] A precipitation cycle is defined in the Recovery Plan as a period when annual rainfall includes average to 35 percent above-average through greater than 35 percent below-average and back to average or greater.

Table 1. Summary display of each protected area specified in the Recovery Plan for the blunt-nosed leopard lizard and downlisting criteria.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Merced or Madera		Not Achieved (0 acres protected)	Not Achieved	Not Achieved	Large preserves have been designated in western Merced County (e.g. Grasslands Ecological Area, ~179,000 acres) but are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.* 2006)
	Kern and Tulare	*Semitropic Ridge Preserve*	Not Achieved (5,278 contiguous acres protected--3,093 acres CNLM; 2,185 acres CDFG)	Achieved on CNLM lands; Not Achieved on CDFG Lands	Not Achieved	Though only slightly less than the specified 5,997 acres of contiguous habitat, only about 1,500 acres of the area support 2 or more lizards per acre (Warrick *in litt.* 2006).
	Kern	*Kern National Wildlife Refuge*	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	The majority this area is seasonally flooded, allowing for only roughly 2,000 acres of potential blunt-nosed leopard lizard habitat. No confirmed sightings of lizard have been reported in this area since 1996 (Williams *in litt.* 2006).
	Kern	*Lokern Natural Area*	Not Achieved (13,160 acres of highly fragmented land protected--includes 3,858 acres BLM, 3,332 acres CNLM, 968 acres CDFG, 840 acres Plains Exploration and Production (PXP), and 4,162 acres Occidental of Elk Hills (OXY)	Achieved on BLM, CNLM and PXP lands; Not Achieved on CDFG and Oxy Lands (outside of the Elk Hills Conservation Area)	Not Achieved	The largest contiguous block of habitat is ~2,882 acres. The draft Chevron Lokern HCP (Chevron, *in prep.* 2008) would protect an additional 11,143 acres, and result in ~24,303 acres of protected contiguous habitat in the area, if finalized.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Kern	*Buttonwillow Ecological Reserve*	Not Achieved (1,350 contiguous acres protected)	Achieved	Not Achieved[1]	This area contains one of the largest and most stable populations on the Valley Floor (Selmon *in litt.* 2006).
	Kern	*CLEP, KWB Conservation Lands, Tule Elk State Reserve*	Not Achieved (11,291 acres protected--6,059-acre CLEP, 4,263-acre KWB Conservation Lands, and 969-acre Tule Elk State Reserve)	Achieved	Not Achieved	Although these Preserves are sizeable, habitat contiguity is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119
	Tulare	*Pixley National Wildlife Refuge*	Not Achieved (6,833 fragmented acres of protected land--principally comprised of 3 large blocks: 4,445, 1,476, and 800 acres)	Achieved	Not Achieved	
	Kern and Tulare	*Allensworth Ecological Reserve*	Not Achieved (5,243 fragmented acres of protected land--principally comprised of 4 large blocks: 2,482, 1,432, 551, and 536 acres.	Achieved	Not Achieved	Blunt-nosed leopard lizard population in this area has declined over the past 15 years (Selmon *in litt.* 2006); no updated data is available.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Benito and Fresno	Ciervo-Panoche Natural Area	Not Achieved (16,600 fragmented acres--the largest contiguous block is roughly 4,800 acres)	Not Achieved	Not Achieved	Much of this area is not suitable habitat due to dense vegetation and high clay soils (Lowe *in litt.* 2006; L. Saslaw, pers. comm. 2006); rather the remaining portions have been noted as some of the best habitat in the Region. However, most prime habitat remains unprotected on private lands. Only 3 of the 21 reported occurrences are within BLM ACEC (CNDDB 2006; Lowe *in litt.* 2006).
	Kern	*Elk Hills Conservation Area*	Not Achieved (7,932 fragmented acres--largest contiguous parcel is roughly 3,770 acres)	Achieved	Not Achieved	The Oxy Elk Hills HCP is in draft form; barring any substantive changes before completion, the HCP is expected to result in the preservation of roughly 38,780 acres of Elk Hills NPR-1 (Live Oak & Associates, *in litt.* 2009).
	Kern	*NPR-2*	Not Achieved (9,000 highly fragmented acres within NPR-2 and the adjacent Buena Vista Valley)	Not Achieved	Not Achieved	The Caliente Resource Management Plan is scheduled to be revised to include BLM lands within NPR-2.
	Kern	*Wind Wolves Preserve*	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	Blunt-nosed leopard lizards have not been observed at the site since the early 1990s.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Luis Obispo	Carrizo Plain Natural Area	Achieved (~250,000 largely contiguous acres protected within the BLM National Monument and adjacent CDFG Ecological Reserve, and the Upper Cuyama Valley (Saslaw *in litt.* 2006).	Achieved	Not Achieved for Carrizo Plain Natural Area	The Resource Management Plan for these areas is currently being revised the BLM; though conserving listed species and habitat will continue to be a primary focus of the revisions.
NOTES: [1]Quantified population density estimates are not currently available for Buttonwillow ER due to a lack of surveys.						

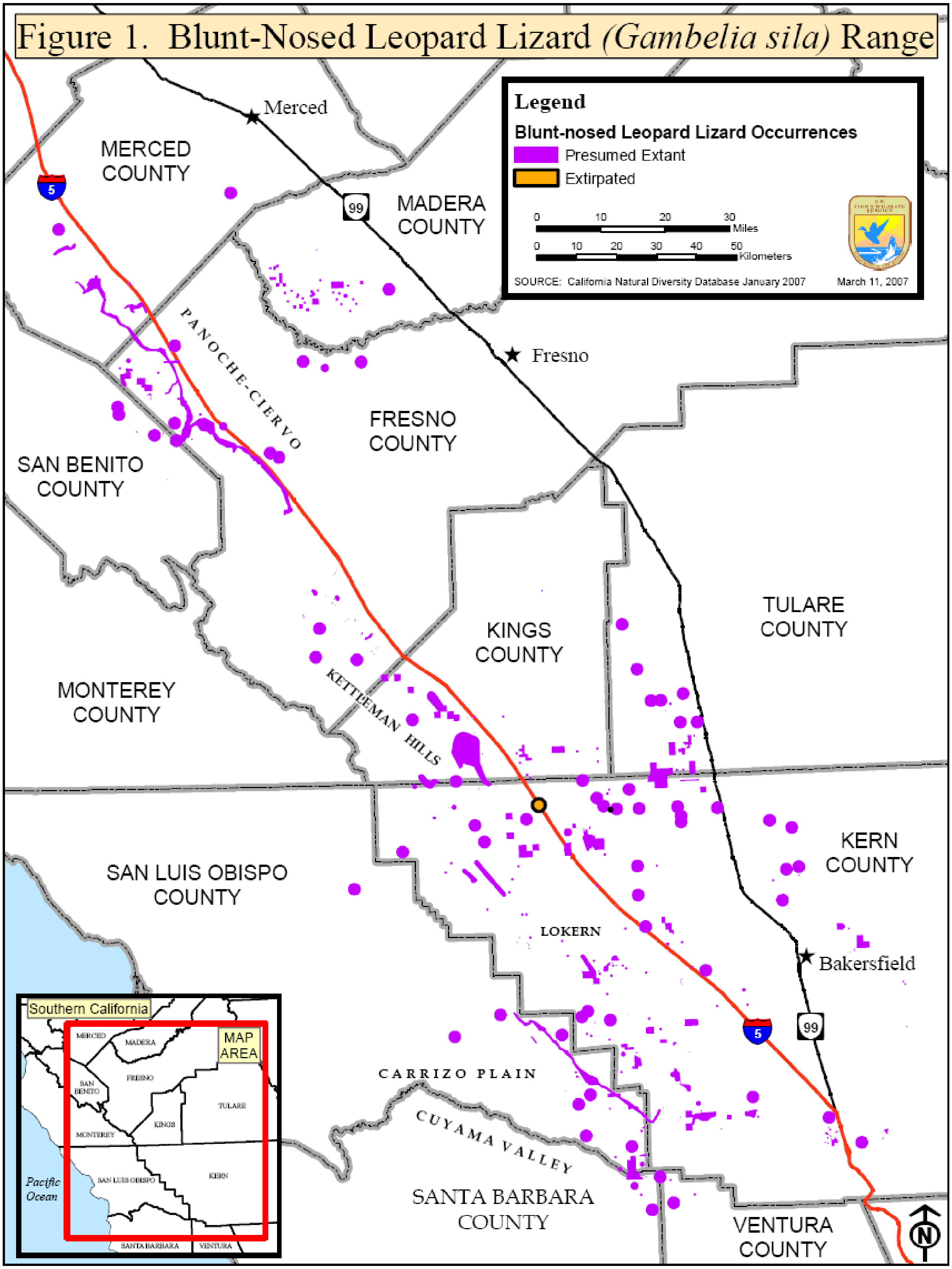

Figure 1. Blunt-Nosed Leopard Lizard (Gambelia sila) Range
Legend
Blunt-nosed Leopard Lizard Occurrences
Presumed Extant
Extirpated
0 10 20 30 Miles
0 10 20 30 40 50 Kilometers
SOURCE: California Natural Diversity Database January 2007
March 11, 2007
Merced
MERCED COUNTY
MADERA COUNTY
Fresno
FRESNO COUNTY
SAN BENITO COUNTY
PANOCHE-CIERVO
KINGS COUNTY
TULARE COUNTY
MONTEREY COUNTY
KETTLEMAN HILLS
KERN COUNTY
SAN LUIS OBISPO COUNTY
LOKERN
Bakersfield
CARRIZO PLAIN
CUYAMA VALLEY
SANTA BARBARA COUNTY
VENTURA COUNTY
Southern California
MAP AREA
Pacific Ocean
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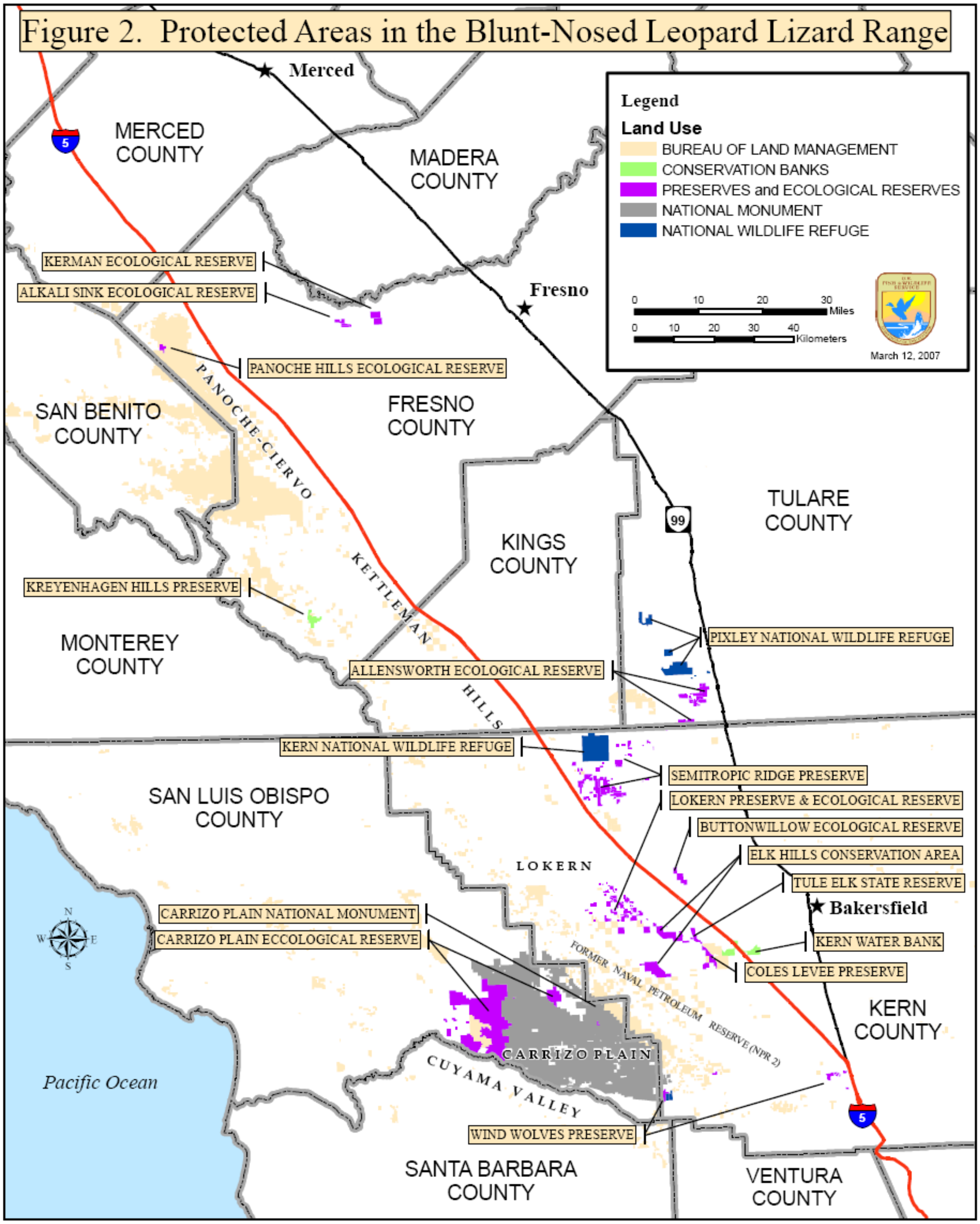

Figure 2. Protected Areas in the Blunt-Nosed Leopard Lizard Range
Legend
Land Use
BUREAU OF LAND MANAGEMENT
CONSERVATION BANKS
PRESERVES and ECOLOGICAL RESERVES
NATIONAL MONUMENT
NATIONAL WILDLIFE REFUGE
0 10 20 30 Miles
0 10 20 30 40 Kilometers
March 12, 2007
Merced
MERCED COUNTY
MADERA COUNTY
Fresno
FRESNO COUNTY
SAN BENITO COUNTY
MONTEREY COUNTY
KINGS COUNTY
TULARE COUNTY
SAN LUIS OBISPO COUNTY
KERN COUNTY
SANTA BARBARA COUNTY
VENTURA COUNTY
Pacific Ocean
Bakersfield
KERMAN ECOLOGICAL RESERVE
ALKALI SINK ECOLOGICAL RESERVE
PANOCHE HILLS ECOLOGICAL RESERVE
PANOCHE-CIERVO
KETTLEMAN HILLS
KREYENHAGEN HILLS PRESERVE
PIXLEY NATIONAL WILDLIFE REFUGE
ALLENSWORTH ECOLOGICAL RESERVE
KERN NATIONAL WILDLIFE REFUGE
SEMITROPIC RIDGE PRESERVE
LOKERN PRESERVE & ECOLOGICAL RESERVE
BUTTONWILLOW ECOLOGICAL RESERVE
ELK HILLS CONSERVATION AREA
TULE ELK STATE RESERVE
KERN WATER BANK
COLES LEVEE PRESERVE
LOKERN
CARRIZO PLAIN NATIONAL MONUMENT
CARRIZO PLAIN ECCOLOGICAL RESERVE
FORMER NAVAL PETROLEUM RESERVE (NPR 2)
CARRIZO PLAIN
CUYAMA VALLEY
WIND WOLVES PRESERVE

Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR, while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. Elkhorn Plain, however, has been reported to have the highest abundance and density of blunt-nosed leopard lizards recorded in any area with densities up to 16 adults per hectare and 35.6 hatchlings per hectare (Germano and Williams 2005). Therefore, the downlisting criterion for population stability has not been achieved for any of the specified protected areas in the Recovery Plan.

Delisting Criteria

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

1) *Three additional areas with about 5,997 acres or more of contiguous, occupied habitat including:*
    - A) *One on the Valley floor;*
    - B) *One along the western Valley edge in Kings or Fresno Counties; and*
    - C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.*
2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Summary of Recovery Criteria

Due to the lack of protection of sufficient habitat in specified recovery areas, the lack of approval and implementation of management plans, and the lack of population stability, the downlisting criteria for blunt-nosed leopard lizard have not been met. Therefore, the delisting criteria for blunt-nosed leopard lizard have also not been met. The acreage of contiguous blunt-nosed leopard lizard habitat protected, adequacy of management plans, and population trends are discussed below for each of the recovery areas specified in the delisting criteria. None of the delisting recovery criteria for protection of habitat, approval and implementation of management plans (except for the Kettleman Hills ACEC), and population stability have been achieved for the specified areas: western Valley edge in Fresno or Kings Counties, Upper Cuyama Valley, and other Valley floor areas. Appendix A includes detailed information used for the analysis of the delisting criteria.

II.C. Updated Information and Current Species Status

Note this section typically includes updated information on species status since the time of listing. However, given the brevity of information included within the 1967 listing rule (Service 1967), and that no previous status reviews for this species have been conducted, the following update presents new information since the issuance of the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980).

II.C.1. Biology and Habitat

II.C.1.a. Abundance, population trends, spatial distribution, and biology

Abundance and Population Trend Surveys
Long-term localized population census and plot-based research studies have been conducted in areas on the Valley Floor (Pixley NWR and Lokern Natural Area) and Foothill Regions (Elk Hills Conservation Area, and Elkhorn Plain) in the southern Valley (see Table 2). As these surveys were conducted to achieve various goals and according to different methods, and given that they represent only a small proportion of the species range, they are not directly comparable. However, they provide some insight to abundance and population trends of this species in specific locations.

Long-term studies show blunt-nosed leopard lizard population instability, especially during years of above average precipitation (Germano *et al.* 2004; Germano *et al.* 2005; Germano and Williams 2005; Germano *in litt.* 2006; Williams *in litt.* 2006). The largest and most stable population of blunt-nosed leopard lizards on the Valley Floor is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 for unknown reasons. Establishing corridors between existing natural areas on the Valley floor in Tulare and Kern Counties will be important for maintaining these populations (especially at the smaller Buttonwillow ER). Relocation of blunt-nosed leopard lizards to some areas such as Allensworth ER (where numbers have plummeted in the past 15 years) will also be necessary for persistence of the population (Selmon *in litt.* 2006). Based on population instability and on-going modification and conversion of existing habitat to agriculture, residential or commercial developments, and for petroleum and mineral extraction activities, overall species abundance is considered to be decreasing across its range.

Table 2. Blunt-nosed leopard lizard survey results for Valley Floor and Foothill Protection Areas; note the surveyed areas account for only a small portion of the species range.

County	Survey Location	Duration of Study	Survey Results (interannual trends)	Comments	Source
Valley Floor					
Tulare	Pixley NWR	1993-2006	Decline	Population fluctuations seemed to be negatively correlated with annual precipitation	Williams *in litt.* 2006
Kern	Lokern Natural Area	1997-2005	Variable	Methods included ten-day census surveys of four grazed and four non-grazed plots; more individuals observed in grazed plots than ungrazed in all but one year	Germano *et al.* 2005
Foothill					
Kern	Elk Hills Conservation Area (Oxy conservation lands--North Flank of the Elk Hills, and Buena Vista Valley)	2000-2005	Increase	Combined road and foot surveys	Quad Knopf 2006
Kern	Elkhorn Plain	1988-2003	Variable	One grazed and one non-grazed plot	Williams *et al.* 1993; Germano and Williams 2005

Spatial Distribution (Current Range)

Historically, blunt-nosed leopard lizards occurred in arid lands throughout much of the San Joaquin Valley and adjacent foothills, ranging from San Joaquin County in the north, to the Tehachapi Mountains in the south, as well as in the Carrizo Plain and Cuyama Valley (Montanucci 1965; Germano and Williams 1992a; McGuire 1996). At the time of listing, the blunt-nosed leopard lizard was found in scattered locations in San Joaquin Valley, in the foothills of Tulare and Kern Counties and up the eastern portions of the Coast Range foothills; Fresno, Kern, Madera, Merced, San Luis Obispo and Tulare Counties (Stebbins 1954, and California Department of Fish and Game 1972 as reported in BLM 1972). Due to widespread agricultural development of natural habitat in the San Joaquin Valley, the current distribution of blunt-nosed leopard lizards is restricted to less than 15 percent of its historic range (Germano and Williams

1992a; Jennings 1995). In the remaining habitat that exists, blunt-nosed leopard lizards occur in alkali sink scrub, saltbush scrub, as well as native and nonnative grasslands on the Valley floor and in the surrounding foothills areas (Montanucci 1965; Germano *et al.* 2001; Stebbins 2003).

Although the blunt-nosed leopard lizard has been listed as endangered for nearly 40 years, there has never been a comprehensive survey of the species entire historical range; thus, any changes in the range of the species from the time of listing are currently unknown. It has been reported that the contemporary range of blunt-nosed leopard lizards was confined to a few areas scattered from southern Merced County to southern Kern County, between elevations of 100-2,400 feet (Tollestrup 1979a). However, as reported in the Recovery Plan (Service 1998), blunt-nosed leopard lizards have been found near Firebaugh and Madera (Williams 1990), Ciervo, Tumey, Panoche Hills, Anticline Ridge, Pleasant Valley, Lone Tree, Sandy Mush Road, Whimesbridge, Horse Pasture, and Kettleman Hills Essential Habitat Areas (CDFG 1985). Also, as recently as May 2009, the Endangered Species Recovery Program (ESRP) of California State University, Stanislaus, reported that blunt-nosed leopard lizards had been observed on the Madera Ranch in western Madera County from surveys conducted for the Madera Irrigation District (Kelly *et al*. 2009).

Biology

Microhabitat use and home range characteristics of blunt-nosed leopard lizards were compared at two sites near Elk Hills in Buena Vista Valley that differed in ground cover (Warrick *et al*. 1998). These authors reported that blunt-nosed leopard lizard microhabitat use differed significantly between the two study sites. At the more densely vegetated site, blunt-nosed leopard lizards used dry wash areas significantly more than grassland, floodplain, and road habitats. Conversely, at the more sparsely vegetated site, grassland was used more than wash habitat, and hills were used less than all other habitats.

Warrick *et al.* (1998) also compared home range size, core area size, and amount of overlap of ranges between the sites. The average male home range size was 10.48 acres, and the average female home range size was 4.99 acres. Female home ranges and core areas were overlapped extensively by male ranges at an average of 79.8 percent and 50.3 percent, respectively. Female home ranges were found to overlap the ranges of up to four other males, but were not observed to overlap with other females.

The span of seasonal activity for both adults and hatchlings described in the Recovery Plan Results was corroborated by results of a two-plot study on the Elkhorn Plain (Germano and Williams 2005). This study further postulated that activity levels can be strongly affected by environmental factors—temperature, precipitation and vegetation characteristics. These factors affect lizard behavior by effecting thermoregulation, metabolism, prey densities, and predatory success or mobility. For example, these authors reported that activity was completely absent for 21 months from July 1989 until April 1991 when individuals remained below ground due to dry conditions. In spite of this anomaly, Germano *et al.* (2004) supported the capacity of a 10-day survey to detect the blunt-nosed leopard lizard presence during typical environmental conditions compared to full-season surveys ($r^2 = 0.96$ for adults, $r^2 = 0.99$ for hatchlings/juveniles). Notably CDFG’s standardized protocol survey methods (CDFG 2004) require a minimum of 12 days of surveys to assess presence/absence for new ground disturbance during specific ambient air and ground temperature conditions.

Germano and Williams (2005) also compared data from the Elkhorn Plain study to data previously collected in Valley floor habitat and noted the following differences in behavior among the two regions. On the Elkhorn Plain, females were generally gravid by late April or early May, while some females were found with eggs in early July. Clutch size on the Elkhorn Plain ranged from 1 to 6 eggs, with a mean clutch size of 3.4 eggs (varying from 3.1 to 3.8 yearly). Many females produced multiple clutches in a year with up to four clutches observed in a single female. On Valley floor sites, clutch size ranged from 2 to 5 eggs with a mean of 2.9 to 3.3 eggs per clutch, and only a few females produced a second clutch (Montanucci 1967; Tollestrup 1982). The greater clutch size and greater frequency of multiple clutches observed on the Elkhorn Plain compared to the Valley floor was attributed to greater prey abundance with the irruptive population growth of grasshoppers in 1992 (Germano and Williams 2005).

II.C.1.b. Genetics, genetic variation, or trends in genetic variation

Gambelia sila and *G. wislizenii* from the San Joaquin Valley and Mojave Desert, respectively, hybridize in the upper Cuyama Valley near the Santa Barbara – San Luis Obispo County line (Montanucci 1978; Slack 2002). The greatest heterogeneity in color pattern and morphology is concentrated near Ballinger Canyon, with most of the *sila*-like lizards occurring to the north and *wislizenii*-like lizards to the south. The leopard lizard hybrid zone covers about 200 acres in Los Padres National Forest and is associated with an ecotone between *Stipa-Atriplex* grasslands and *Pinus-Juniperus-Artemisia* Great Basin shrub desert (Slack 2002). Most evidence shows that natural selection is opposing the production of hybrids between the two forms of leopard lizards. The intermediate phenotypes have a lower fitness than those approaching the parental species (Montanucci 1978). The hybridization likely began 20,000 years ago when the ranges of the two species overlapped in the vicinity of Ballinger Canyon. Climatic changes since then have resulted in the isolation of the hybrid population (Montanucci 1979). Thus, though not currently protected, the hybrid population is at risk of extinction due to the degradation of its habitat by heavy off-road vehicle (ORV) use, the conversion of 95 percent of its habitat into alfalfa fields, and the construction of roads and oil development activities (Montagne 1979; Slack 2002; Stafford *in litt.* 2006).

II.C.1.c. Taxonomic classification or changes in nomenclature

The blunt-nosed leopard lizard was federally listed in 1967 as *Crotaphytus wislizenii silus* (Service 1967). At the time of listing (Service 1967), this species was named *Crotaphytus silus*, according to Stejneger (1890) first description and nomenclature of the species. However, the precise taxonomic split between the collared and leopard lizard remained largely in debate until Montanucci (1970) argued for specific status based upon the study of hybrids between the long-nosed and blunt-nosed leopard lizards. The taxonomic debate was resolved when Montanucci (1970) separated the genera *Gambelia* from *Crotaphytus*, resulting in the generic epithet name *Gambelia silus* for the blunt-nosed leopard lizard. Montanucci *et al.* (1975) separated all leopard lizards from collared lizards, placing both *silus* and *wislizenii* into the genus *Gambelia* at full species status. Most recently, the specific spelling was changed to *sila* such that its gender agreed with the genera name *Gambelia* (Frost and Collins 1988; Collins 1990; Germano and Williams 1992b).

II.C.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act. The final ruling to list the blunt-nosed leopard lizard as endangered did not include a discussion of the threats to the lizard. The Service is using reports from the California Department of Fish and Game (Laughrin 1970; Morrell 1972, 1975), and the 1980 *Recovery plan for the blunt-nosed leopard lizard* to address threats that affected the lizard at the time of its listing.

II.C.2.a. Factor A, Present or threatened destruction, modification or curtailment of its habitat or range

This section summarizes the threats included under Factor A, and also covers the conservation efforts implemented to reduce threats over the known range of the blunt-nosed leopard lizard. At the time that the blunt-nosed leopard lizard was listed, the conversion of native habitat to agriculture was considered to be the primary threat to species. Additional threats to the blunt-nosed leopard lizard included habitat fragmentation, mineral development (primarily for oil and gas extraction), inappropriate grazing levels, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965).

Past research on this species reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizards (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Since listing, the Service has identified additional potential threats to the blunt-nosed leopard lizard including: landscape leveling and cultivation which caused habitat disturbance, destruction and fragmentation; grazing (under- or over-grazing); mineral development, primarily oil and gas extraction; and, agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965). The 1998 Recovery Plan added mortality from vehicle-strikes with roadway traffic and/or ORV (discussed in Factor E) to the threat list.

The loss and modification of habitat due to agricultural conversion and urban development remain the largest threat to the blunt-nosed leopard lizard. Mineral exploration and extraction, and water banking activities also affect a significant portion of the blunt-nosed leopard lizards range. More recently the proposed siting of solar facilities in blunt-nosed leopard lizard habitat is an emerging threat that has the potential to substantially affect blunt-nosed leopard lizard. Specific information of these on-going and recent threats and habitat conservation activities are described in detail below.

Collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Land conversions contribute to declines in blunt-nosed leopard lizard abundance directly and indirectly by increasing mortalities from sources including: displacement and habitat fragmentation, reducing feeding, breeding, and sheltering sites, and by reducing the carrying capacity and prey populations for occupied sites.

Dramatic loss of blunt-nosed leopard lizard habitat has continued to occur since the drafting of the 1980 Recovery Plan. According to Service files and a preliminary assessment of issued biological opinions from 1987 to 2006, roughly 120 projects permitted incidental take of blunt-nosed leopard lizard. In total, these projects allowed for the incidental take of approximately 220 individuals and roughly 21,200 acres of impacts to blunt-nosed leopard lizard habitat. Of these activities, the habitat disturbance was authorized for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB operations 6,000 acres permanent), and other agricultural, residential, and commercial development activities (covered under the Metropolitan Bakersfield HCP 15,200 acres permanent).

Note, these figures account for only those projects that were reviewed under the Act; the estimations do not include any loss of habitat or adverse effects from habitat conversion that was not reported to the Service. Presently, additional habitat loss can be expected due to on-going modification and conversion of existing habitat for agriculture, residential or commercial developments, oil and gas exploration activities, the construction of water banking facilities, and solar power developments.

Habitat Threats from Agriculture and Urban Development

Conversion of land for agricultural purposes continues to be the most critical threat to the blunt-nosed leopard lizard. Although the increment of habitat loss attributable to urban development appears to be increasing, this activity remains less significant than agriculture for this species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it common for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

Conversion of natural lands to agriculture has continued since the listing of the blunt-nosed leopard lizard. The 1980 Recovery Plan reported that between 1976 and 1979, habitat loss for the blunt-nosed leopard lizard was occurring at a rate of approximately 19,200 acres per year (Service 1980). By 1979, roughly 95 percent (approximately 8.1 million acres out of a total 8.5 million acres) of habitat on the San Joaquin Valley floor had been converted or otherwise destroyed (Service 1980; Williams 1985). The California Department of Water Resources has predicted continued loss of wildland habitat to agricultural conversion at a rate of 10,000 to 30,000 acres per year. The California Department of Forestry (1988) predicted wildland habitat losses totaling 465,000 acres in the San Joaquin Valley region between 1980 and 2010 as a result of agricultural conversion and urbanization. Much of the projected loss is likely to occur in the remaining blocks of habitat for listed and proposed species, where conversion also isolates populations by increasing habitat fragmentation, and limits availability of suitable habitat for future recovery of the species

The conversion of blunt-nosed leopard lizard habitat into agricultural fields continues to be a threat to blunt-nosed leopard lizard on private lands on the Valley floor. For example, in August 2006, about 1,300 acres of saltbush scrub and sink scrub habitat were illegally disced for cultivation of melons on the Valley floor along Interstate 5 north of the Kings – Kern County line. Blunt-nosed leopard lizards occur in several locations a few miles from the site (Vance *in litt.* 2006). Another similar instance of illegal discing of saltbush habitat was reported on the Valley floor in Kern County (Krise *in litt.* 2006).

The Panoche Valley was identified an important area for blunt-nosed leopard lizard within the Ciervo-Panoche Natural Area (Service 1998). However, the majority of the Panoche Valley remains unprotected on private lands. In September 2006, the real estate company Schuil and Associates sold a 1,200-acre parcel of rangeland in the Panoche Valley to private interests, and another 9,000 acres of Panoche Valley rangeland are on sale for potential home sites zoned for agricultural rangeland 40-acre minimum site size. The Panoche Creek and Silver Creek were identified as important dispersal corridors within the Ciervo-Panoche Natural Area (Service 1998; Lowe *et al.* 2005; L. Saslaw, BLM, pers. comm. 2006), but the majority of these areas remain unprotected and subject to residential and agricultural development.

Between 1970 and 2000, the human population of the San Joaquin Valley doubled in size; it is expected to more than double again by 2040 (Field *et al.* 1999; Teitz *et al.* 2005). The increasing population combined with the concurrent high demand for limited supplies of land, water, and other resources, has been identified as a principal underlying cause of habitat loss and degradation (Bunn *et al.* 2007).

Numerous large residential housing developments have been proposed in blunt-nosed leopard lizard habitat within the Metropolitan Bakersfield HCP (MBHCP) service area, including the 4,000 acre Gateway Specific Plan, and the 890 acre Canyons residential housing development. Impacts from these large-scale developments would likely extend beyond their physical footprint, considering potential effects upon dispersal corridors and habitat connectivity across the Valley floor. Additionally, the City of Taft recently proposed to expand its sphere of influence to cover roughly 157,570 acres of land (246.2 square miles), including approximately 9,622 acres of land within existing City limits and 147,948 acres of land within the proposed Expansion Area (City of Taft 2009). The recent economic recession in combination with other factors have delayed planning and construction of proposed development in Bakersfield and throughout the Valley; in some cases the applicants have withdrawn their proposals entirely. Nonetheless, blunt-nosed leopard lizard habitat degradation in, and around, Bakersfield, Taft and other urban areas remains a threat on unprotected private lands.

Habitat Threats from Oil and Gas Exploration

Oil and natural gas exploration activities continue to degrade blunt-nosed leopard lizard habitat in western Kern, Kings, and Fresno Counties. The construction of facilities related to oil and natural gas production, such as well pads, wells, storage tanks, sumps, pipelines, and their associated service roads degrade habitat and cause direct mortality to blunt-nosed leopard lizards. Leakage of oil from pumps and transport pipes, and storage facilities, surface mining, and ORV use also degrade blunt-nosed leopard lizard habitat (Madrone Associates 1979; Chesemore 1980; Mullen 1981; Service 1985; Kato and O'Farrell 1986; Service 1998).

From 2001 to present, 38 projects have been permitted through the Oil and Gas Programmatic biological opinion (BLM 2008) with potential to affect blunt-nosed leopard lizards. These 38 projects have impacted approximately 19 acres of occupied or potential habitat. Additionally, under this programmatic opinion the incidental take of four individual blunt-nosed leopard lizards has been reported: one presumed vehicle strike at the Carneros Devils Den area, and one at Kettleman Hills Middle Dome area; and, two assumed predation mortalities. Under the Oil and Gas Programmatic biological opinion, impacts to blunt-nosed leopard lizard habitat are generally minimized by applying a ratio of 3:1 for the purchase and protection of other existing habitat for each acre of suitable habitat impacted (Service 2001, 2003). However, this only results in the protection of existing habitat and not the creation of new blunt-nosed leopard lizard habitat; thus, each project effectively represents a net loss in total habitat.

Formal consultation between the BLM and the Service was initiated on April 10, 2008, for the development of a programmatic biological opinion for seismic exploration projects for which the BLM is the Federal nexus. Thus far, this programmatic opinion is expected to cover four specific projects, and others that may arise in the future. The four seismic exploration projects that have submitted formal requests include: the Buena Vista Seismic Exploration Project near Taft (roughly 128,000 acres) (Occidental of Elk Hills, Inc., *in litt.* 2008); the Chevron's Kettleman Hills Seismic Exploration Project (roughly 131,500 acres) (BioEnvironmental Associates, *in litt.* 2008a); the Aera Energy LLC Seismic Exploration Project near McKittrick (roughly 73,600 acres) (BioEnvironmental Associates, *in litt.*2008b); and, the Belgian Anticline Seismic Exploration Project (roughly 33,270 acres) (E&B Natural Resource Management, *in litt.* 2008). Disturbances associated with these projects are predominantly temporary and are dispersed across large land areas but, nonetheless, have potential to impact blunt-nosed leopard lizards, or adversely affect their habitat. At the time of this review, impacts of these projects on the blunt-nosed leopard lizard are not known. Nonetheless, it is anticipated that blunt-nosed leopard lizards are likely to be adversely affected by vehicle strikes, entombment in burrows, temporary loss or degradation of their habitat, and harassment from noise and vibration. Some blunt-nosed leopard lizards may escape direct injury if burrows are destroyed, but become displaced into adjacent areas. They may be vulnerable to increased predation, exposure, or stress through disorientation, loss of foraging and food base, or loss of shelter. Furthermore, it is expected that any positive results from seismic testing will subsequently result in proposals for oil and gas extraction projects; if these proposals are within listed species habitat, a separate consultation with the Service would be required.

Habitat Threats from the Construction of Water Banking Facilities

The on-going need to provide and secure water supplies for continued urban and rural use throughout California has increased the demand for new construction of water banking facilities. This need was formalized by Executive Order S-06-08 (signed on June 4, 2008 by Governor Arnold Schwarzenegger), which officially declared a statewide drought, and a state of emergency in nine Central Valley Counties with exceptionally urgent water needs: Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern. Currently, the Service is engaged in informal consultation with two proposed water banks that have potential to impact blunt-nosed leopard lizards—Madera Irrigation District's Madera Water Supply Enhancement Project, and Semitropic's Stored Water Recovery Unit. These projects potentially threaten the blunt-nosed leopard lizard by: directly removing habitat (through flooding, or the establishment of infra-structure); changing habitat quality (vegetation structure, higher predation, reduced prey, etc.); and, increasing the incidence of take through vehicle strikes.

The proposed 10,000-acre Madera Water Supply Enhancement Project is proposed as a groundwater recharge bank in western Madera County. The presence of blunt-nosed leopard lizards throughout the proposed site was verified by May 2009 surveys. At this time specific impacts of the project to the blunt-nosed leopard lizards have not yet been determined. However impacts associated with the project are likely given that the project entails the flooding of roughly 700 acres of swale habitat, and the construction of roughly 3,000 acres of percolation ponds. Additional effects to this species, beyond the flooding of suitable habitat, would be attributable to the permanent conversion of habitat to water bank infrastructure including the construction of access roads, powerlines, pipeline and canal conveyance systems, and numerous water extraction well pads. Requirements under the California Environmental Quality Act (CEQA) were completed in September 2005, and the applicant has initiated informal consultation with the Service for this project.

Currently, the Semitropic Water District is proposing the development of a large groundwater extraction project—the Stored Groundwater Recovery Unit—southeast of the Kern NWR, near Semitropic, California (Entrix, GEI Consultants, Inc., and Live Oak & Associates *in litt*. 2008). This project includes the following activities that have potential to affect the blunt-nosed leopard lizard: construction of a well extraction field across five sections of land (roughly 3,000 acres), ancillary well connection pipes, roughly 4 miles of open canal, and 7 miles of large diameter (120-inch) pipeline. The proposed project is located on blunt-nosed leopard lizard habitat near the Semitropic Ridge Preserve and the Kern NWR. At this time, however, potential impacts of the project to the blunt-nosed leopard lizard have not been assessed, but impacts are likely through the permanent conversion of habitat to water bank infrastructure including construction of access roads, powerlines, pipeline and canal conveyance systems, and roughly 65 water extraction well pads. Moreover, the proposed water bank will likely augment the conversion of native lands to agriculture by increasing water supply availability in the southern San Joaquin Valley.

Habitat Threats from Solar Power Developments

Solar power development projects pose potential threats to blunt-nosed leopard lizards and may impact vast amounts of habitat. These projects can destroy, fragment, or impact blunt-nosed leopard lizard habitat by: altering landscape topography, vegetation, and drainage patterns; increasing vehicle-strike mortality; and, reducing habitat quality through interception of solar energy normally reaching the ground surface, affecting ambient air temperatures through habitat shading, and altering soil moisture regimes (Smith 1984; Smith *et al*. 1987). Moreover, recently proposed solar projects tend to be large contiguous blocks of disturbance in undeveloped habitat lands, ranging from hundreds to several thousand acres. Currently, eight solar power farms have been proposed (see Table 3).

Table 3. Solar power projects that have been proposed within blunt-nosed leopard lizard habitat.

Project Name (Applicant)	Location (Region/County/Protected Area)	Proposed Habitat Disturbance (acres)[1]	Status
SunGen (Complete Energy Holdings, Inc., and La Paloma Generating Company LLC)	Valley Floor/Kern	270-290 (P)	Informal consultation has been initiated.
Cymric	Valley Floor/Kern	Unknown	Informal consultation has been initiated.
California Valley Solar Ranch (High Plains Ranch II, LLC, Sun Power Corporation, Systems)	San Luis Obispo/Carrizo Plain	4,365 (P)	Informal consultation has been initiated.
Topaz Solar Farm (First Solar, Inc.)	San Luis Obispo/Carrizo Plain	6,200 (P)	Informal consultation has been initiated.
Carrizo Thermal Solar Farm (Ausra, Inc.)	San Luis Obispo/Carrizo Plain	640 (P); 380 (T)	Formal consultation has been initiated; Ausra, Inc. was purchased by First Solar, Inc. in 2009.
San Joaquin Solar 1 & 2 (San Joaquin Solar, LLC)	Foothills/Fresno/Coalinga	640 (P)	Informal consultation has been initiated.
Sun City and Sun Drag	Foothills/Kings/Avenal	Approximately 1000 (P)	Informal consultation has Not been initiated
Solargen Solargen Energy, Inc.	Foothills/Fresno/Panoche Valley	Total amount not determined but will be between 7,000 and 29,000 (P)	Informal consultation has been initiated.
Notes: [1] Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T).			

Conservation Efforts and Habitat Protection

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permits include take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs area summarized in Table 4 below, and described in further detail in Appendix B. Effectively, through section 10 consultations and the HCP process, 89,288 acres of habitat land have been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft).

The Central Valley Project (CVP) was constructed to protect the Central Valley from water shortages and floods. Irrigation water provided through the CVP subsequently facilitated the conversion of native habitats to agricultural lands (Bureau of Reclamation 2006). The effect of this large-scale loss of native habitat reduced populations of several species, which resulted in the listing of over twenty species in the San Joaquin Valley under the under the Act.

Subsequently, Congress passed the Central Valley Project Improvement Act (CVPIA) in 1992, mandating changes in the management of the CVP particularly for the protection, restoration, and enhancement of fish and wildlife. The CVPIA is comprised of several programs, including the CVPIA Habitat Restoration Program (HRP; §3406(b)(1) of the CVPIA). The Central Valley Project Conservation Program (CVPCP) was the result of a section 7 consultation with the Bureau of Reclamation (BOR) for Friant Dam water contracts.

Under the CVPCP, the blunt-nosed leopard lizard was designated as a very high priority for recovery due its imminent threat of extinction, and the fact that CVP actions significantly contributed to the species decline, either directly or indirectly and given that the species is considered to have an imminent threat of extinction. The CVPCP program is funded at approximately 2.3 million dollars annually, and has thus far funded 84 total projects since its commencement; 11 of the 84 are within alkali scrub or annual grassland habitat and specifically include the blunt-nosed leopard lizard as a focal species. Principally these projects have included habitat protection and restoration through the establishment of conservation easements and land acquisition in fee title (see Table 5). Other CVPCP goals for the recovery of the blunt-nosed leopard lizard include: determine habitat management and compatible land uses; conduct surveys for species presence and absence; and, protect key habitat areas within the known range of the species.

A principal program under the CVPIA HRP is the Land Retirement Program (Law 102-575 Title 34, Section 3408(h)), which is designed to reduce irrigated agricultural drainage problems. It comprises an interagency Department of Interior Land Retirement Team and includes representatives from BOR, the Service, and the BLM. It was estimated that by 2040 approximately 400,000 to 554,000 acres of land would become unsuitable for irrigated agriculture if no actions were taken to remedy drainage problems. Under this program, those irrigated agricultural lands that are characterized by low productivity, poor drainage, shallow water tables, and high groundwater selenium concentrations would be retired from irrigated

Table 4. Since the time of listing, 14 HCPs have been developed and implemented (note the California Aqueduct San Joaquin Field Division HCP is currently in draft form); additional information is provided in Appendix B.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Coles Levee	Valley Floor/Kern	990	Coles Levee Ecosystem Preserve	270 (P)	HCP is not currently valid
Coalinga Cogeneration	Foothills/Fresno	179	On-site	49.6 (P); 27.6 (T)	June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.
California Department of Corrections Delano Prison	Valley Floor/Kern	348/514	On-site /Allensworth ER	287 (P); 348 (T)	Compensation includes habitat enhancement and revegetation
California Department of Corrections Statewide Electrified Fence Project	Valley Floor/Kern	282/800[2]	Allensworth ER	Take of 2 Individuals	A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003)
Chevron Pipeline	Valley Floor/Kern/Lokern	28	Lokern Area	25.5 (T)	
Granite Construction Phase I	Foothills/Fresno/Coalinga	162	Semitropic Ridge ER	54 (P)	

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Kern County Waste Facilities	Valley Floor/Kern	755[3]	Coles Levee Ecosystem Preserve	251 (P)[3]	Project impacts are limited to 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres near Taft in Kern County
KWB Authority	Valley Floor/Kern	4,263	On-site	12,081 (P); 291 (T)	
Metropolitan Bakersfield	Valley Floor/Kern	3:1 compensation for Natural Lands	Off-site	15,200 (P)	Acquired throughout the duration of the HCP as impacts are incurred; the HCP is valid until 2014.
Nuevo Torch	Valley Floor/Kern	840	Lokern Area	850 (P)	Now called PXP
California Aqueduct San Joaquin Field Division	Valley Floor/Kern	567/3,474[4]	On-site	340 (P); 835 (T)	HCP is currently in draft form. Total impacts are limited to 1,295 acres: 1,185 acres of impact will be compensated at time of issuance, 110 acres of impacts will be compensated as they occur

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Seneca and Enron Oil and Gas	Valley Floor/Kern			650 (P)	
Enviro Cycle	Valley Floor/Kern			20 (P)	
Pacific Gas and Electric	Valley Floor and Foothill Regions/ Nine Counties of the San Joaquin Valley/All Protected Areas except Carrizo Plain	360	Areas of occupied and/or suitable habitat to be conserved in perpetuity via future conservation easement	9 (P); 690 (T)	An additional 3, 930 acres of covered activities may occur in suitable habitat
Total		**89,288[5]**		**29,382.6 (P); 1,527.1 (T)**	

Notes: [1]Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T); [2]Compensation included acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and an additional 800 acres of low quality laser-leveled farmland, both at Allensworth ER; [3]These figures are comprehensive for compensation and impacts associated with the HCP, and not specific to blunt-nosed leopard lizard impacts specifically; [4]567 acres will be compensated through traditional Service procedures, while the 3,474 acres will be managed to conserve habitat to the maximum extent possible (i.e., habitat may be disturbed or impacted during emergency maintenance and operational procedures); and, [5]This total does not include habitat conservation lands acquired by CDFG through the Metropolitan Bakersfield HCP, and also does not include the 3,474 acres that DWR will manage under the proposed draft California Aqueduct San Joaquin Field Division HCP.

agriculture through a willing seller program. The original goal under the Land Retirement Program was set at 15,000 acres (see Table 5). However, the actual acreage retired thus far for restoration is limited to 9,306 acres: 7,216 acres at Atwell Island in southwestern Tulare County and 2,090 acres at the Tranquility in western Fresno County. The restoration of former irrigated agricultural lands to arid upland and alkali sink habitat are expected to benefit the blunt-nosed leopard lizard. As noted in Table 5, goals for Atwell Island are set at 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres, or 5,051 acres at Atwell Island would be restored to alkali sink habitat suitable to support blunt-nosed leopard lizards; 2,090 acres at the Tranquility site would be restored to uplands or alkali sink.

Under the CVPCP, HRP or Land Retirement Program there was no obligation for BOR to purchase and conserve a specific amount of land. Conversely however, the California State Water Resources Control Board (SWRCB) in Decision-1641 imposed a mitigation requirement on the Bureau of Reclamation for agricultural land conversions that occurred prior to December 29, 1999 outside the CVP contract supply Consolidated Place of Use. The requirement is referred to as the Encroachment Mitigation. This Decision, which included specific requirements for alkali scrub habitat and grassland habitat, is significant for the recovery of blunt-nosed leopard lizard. The SWRCB identified 45,390 acres of habitat including 23,165 acres of alkali scrub habitat (primarily in the Westlands Water District of western Fresno County) that was converted without authorization under the Act to plowed and irrigated agriculture land, and that needs to be mitigated with in-kind habitat acquired by 2010 (SWRCB 2000). As of May 2009 roughly 9,397 acres (or 40.6 percent of the required 23,165 acres) of alkali scrub habitat had been acquired by BOR (D. Kleinsmith, BOR, *in litt.* 2009). Furthermore, in total only 25,706 acres of habitat for any species had been acquired by May 2009 (as noted in Table 5, 4,960 acres of grassland habitat is speculated to be suitable for blunt-nosed leopard lizards (D. Kleinsmith, *in litt.* 2009).

Although these land acquisition and retirement programs may protect habitat suitable for blunt-nosed leopard lizards, it should be qualified that the suitability of these lands to support blunt-nosed leopard lizard has been only coarsely determined by BOR at this time; the suitability in terms of habitat quality and landscape connectivity has not yet been evaluated by the Service. The biological opinion for the Land Retirement Program (Service 1999) recommended a 5-year Habitat Restoration Study (HRS) to determine the responses of wildlife to land retirement and restoration efforts. HRS objectives were to determine the efficacy of revegetation with native plants and microtopographic contouring for upland habitat restoration and to examine the responses of plants and wildlife at the 800-acre Tranquility study site. Beginning in 1999, vegetation, invertebrates, amphibians, reptiles, birds, and small mammals were all monitored throughout the duration of the project. The California king snake (*Lampropeltis getulus californiae*), gopher snake (*Pituophis melanoleucus*), and western whiptail (*Cnemidophorus tigris multiscutatus*) were the only reptile species observed at the Tranquility site. It is anticipated that species in the vicinity of the Tranquility Site will re-inhabit the area; however due to the distance to the nearest known population, blunt-nosed leopard lizards would most likely have to be reintroduced to the retired lands. To date, there is no available research on

Table 5. Summarized status of BOR acquired mitigation, from the 2007 Consolidated Place of Use Encroachment, which espouses habitat compensation from existing programs, including: CVPCP, HRP, Land Retirement Program projects, as well as BOR's wetlands program (D. Kleinsmith, *in litt.* 2009).

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
ALKALI SCRUB:								
Allensworth Ecological Reserve Addition	Alkali scrub	San Joaquin kit fox, Tipton kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard.	360	Protection	Tulare and Kern	1998	100%	360
Carrizo Plains National Monument Inholdings	Alkali scrub	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover's wooly star.	665	Protection	Kern	2007	100%	665
Elgorriago Ranch	Alkali scrub	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,231	Protection	Fresno and San Benito	2007	100%	1,231

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Goose Lake Land Acquisition	Alkali scrub	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Land Retirement Demonstration Project (Atwell Island and Tranquility)	Alkali scrub	Potential for all San Joaquin Valley species.	7,141 (5,051 and 2,090, respectively)[2]	Restoration	Fresno, Kings, and Tulare	Unknown	100%	7,141
TOTAL ACRES FOR ALKALI SCRUB		**23,165 acres owed**	**9,397 acres acquired**					**9397**
ANNUAL GRASSLAND: 17,573 acres owed								
Bayou Vista Property	Annual grassland	Swainson's hawk, Tipton kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard.	515	Protection	Tulare	2004	46%	236.9

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Carrizo Plains National Monument Inholdings	Annual grassland	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover's wooly star.	800	Protection	Kern	2007	100%	800
Elgorriago Ranch	Annual grassland	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,400	Protection	Fresno and San Benito	2007	100%	1,400
Goose Lake Land Acquisition	Annual grassland	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Pixley NWR Acquisition	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard, Tipton kangaroo rat.	345	Protection	Tulare	2006	100%	345

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Romero and Simon-Neuman Ranches	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard.	24,589	Protection	Stanislaus, Santa Clara, Merced	1988 to 1999	9.40%	2,311.4
TOTAL ACRES FOR ANNUAL GRASSLAND		**17,573 acres owed**	**4.960 acquired**					**4,960**

Note: [1]The suitability of these lands to support blunt-nosed leopard lizard has been determined by BOR, and has not been reviewed by the Service. [2]Thus far, BOR has acquired 9,306 acres—7,216 acres at Atwell Island and 2,090 acres at Tranquility; however unlike the Tranquility site, restoration goals for Atwell Island are 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres (5,051.2 acres) at Atwell Island would be alkali sink habitat suitable for the blunt-nosed leopard lizard; whereas, all 2,090 acres at the Tranquility site would be restored to uplands or alkali sink. The total upland habitat or alkali sink habitat for land retirement is 5,051.2 + 2,090 = 7,141.2.

the ability of blunt-nosed leopard lizard to recolonize fallow fields and whether the Land Retirement Program will be successful in providing habitat for the species.

Additionally, the future ownership and status of these lands—whether they would be restored to habitat, or utilized for other purposes (i.e., dry-farmed)—remains unknown. The Land Retirement Program, however, while preventing the application of CVP water to agricultural fields, does not prevent the application of irrigation water from other sources or require the restoration of the lands to native habitat. Often an alternative irrigation supply is provided to the land, which in turn prevents the return of most agricultural fields back to natural habitat.

Furthermore, at present, Reclamation does not plan to pursue any further land acquisitions under the land retirement program authorization (D. Kleinsmith, pers. comm. 2009). Thus it is unlikely that BOR will acquire the additional 16,141 acres by the court ordered deadline.

In conclusion, it is currently unknown whether these programs will offset the blunt-nosed leopard lizard habitat losses that have occurred. Further assessment on the effects of these programs, combined with supplemental research, will be required to determine their contribution on blunt-nosed leopard lizard recovery.

Summary of Factor A Threats

In summary, broad-scale land conversion of natural habitat has resulted in substantial reduction of available blunt-nosed leopard lizard habitat. Service databases report that roughly 35,000 acres of permanent impacts and 10,000 acres of temporary disturbance have been authorized within blunt-nosed leopard lizard habitat (note: these values do not include those acres of additional impacts to scrub and grassland from those programs described above, under the CVP).

Fragmentation of residual habitat, which further isolates remaining blunt-nosed leopard lizard populations, continues due to on-going agricultural conversion of natural habitat, residential development, oil and gas exploration and extraction activities. Though several HCPs and biological opinions, as well as the CVPCP, CVPIA, and Decision-1641 have resulted in the conservation of substantial amounts of land acreage, the use and recolonization of these conserved lands by blunt-nosed leopard lizards is limited by the fragmentation and isolation of the parcels, the distribution of remaining populations, and dispersal abilities of the species.

II.C.2.b. Factor B, Overutilization for commercial, recreational, scientific, or educational purposes

At the time of listing, overutilization for commercial, recreational, scientific, or educational purposes was not considered to be a threat, and is not discussed as a threat in the 1998 Recovery Plan. There are no updates relevant to this factor, nor has the potential of this threat increased noticeably since the 1998 Recovery Plan.

II.C.2.c. Factor C, Disease or predation

At the time of listing predation was not considered a potential threat to survival of the species and its recovery. Montanucci (1965) reported that the list of predators in Madera and Fresno

Counties of the blunt-nosed leopard lizard included the following species: spotted skunk (*Spilogale putorius*), ground squirrel (*Citellus beecheyi*), shrike (*Lanius ludovicianus gambeli*), American kestrel (*Falco sparverius*), burrowing owl (*Speotyto cunicularia hypugaea*), roadrunner (*Geococcyx californianus*), whipsnake (*Masticophis flagellum ruddocki*), gopher snake (*Pituophis catenifer*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and badger (*Taxidea taxus*).

The following animals are currently known to prey on blunt-nosed leopard lizards: whip snakes, gopher snakes, glossy snakes (*Arizona elegans*), western long-nosed snakes (*Rhinocheilus lecontei*), northern Pacific rattlesnakes (*Crotalus viridis oreganus*), common king snakes, western rattlesnakes, loggerhead shrikes (*Lanius ludovicianus*), American kestrels (*Falco sparverius*), prairie falcons (*Falco mexicanus*), burrowing owls (*Athene cunicularia*), greater roadrunners (*Geococcyx californianus*), golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), California ground squirrels, spotted skunks (*Spilogale putorius*), striped skunks (*Mephitis mephitis*), American badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and San Joaquin kit foxes (Montanucci 1965; Tollestrup 1979b; Hansen *et al.* 1994; Germano and Carter 1995; Germano and Brown 2003). This list is likely not exhaustive for all incidences of predation that occur across the range of the blunt-nosed leopard lizard, nor has the magnitude of effects derived by predation on population trend and stability been researched at this time. Thus it remains unknown as to whether predation is a major threat to the survival and recovery of this species.

Without mammal burrows, blunt-nosed leopard lizards are more susceptible to predation (Hansen *et al.* 1994). The construction of artificial perches (i.e., fence posts) for burrowing owls, and other predators increases the risk of predation on blunt-nosed leopard lizards (L. Saslaw, BLM, pers. comm. 2006). Additionally, the territorial behavior of blunt-nosed leopard lizard males may expose them to higher rates of predation than if they were secretive (Tollestrup 1982, 1983; Germano and Carter 1995; Lappin and Swinney 1999).

There are no known diseases in blunt-nosed leopard lizards, but endoparasites (nematodes) and ectoparasites (mites and harvest mites) have been reported (Montanucci 1965). The overall effect of the parasites on the blunt-nosed leopard lizard is not currently known.

II.C.2.d. Factor D, Inadequacy of existing regulatory mechanisms

The blunt-nosed leopard lizard was listed as endangered under the Act in 1967, and subsequently listed as an endangered species by the State of California in 1971. At the time of Federal listing, many of the current environmental laws did not yet exist.

There are several State and Federal laws and regulations that are pertinent to federally listed species, each of which may contribute in varying degrees to the conservation of federally listed and non-listed species. These laws, most of which have been enacted in the past 30 to 40 years, have greatly reduced or eliminated the threat of wholesale habitat destruction, although the extent to which they prevent the conversion of natural lands to agriculture is less clear.

State Laws and Regulations in California

The State's authority to conserve rare wildlife and plants is comprised of four major pieces of legislation: the California Endangered Species Act, the Native Plant Protection Act, the California Environmental Quality Act, and the Natural Community Conservation Planning Act.

California Endangered Species Act (CESA): The CESA (California Fish and Game Code, section 2080 *et seq*.) prohibits the unauthorized take of State-listed threatened or endangered species. The blunt-nosed leopard lizard was listed as endangered by the State of California in 1971. The CESA requires State agencies to consult with the California Department of Fish and Game on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities. The blunt-nosed leopard lizard was listed as State endangered species under CESA on June 27, 1971.

California Department of Fish and Game Code §5050--Fully Protected Reptiles and Amphibians Species: The blunt-nosed leopard lizard is a fully-protected animal under the California Fish and Game Code §5050; fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. Therefore salvage and relocation for this species is not currently an option under State law.

California Environmental Quality Act (CEQA): The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Planning Act: The Natural Community Conservation Program is a cooperative effort to protect regional habitats and species. The program helps identify and provide for area wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many Natural Community Conservation Plans (NCCPs) are developed in conjunction with Habitat Conservation Plans (HCPs) prepared pursuant to the Federal Endangered Species Act.

Federal Laws and Regulations

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq*.) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects

(40 **CFR** 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

Clean Water Act: Under section 404, the U.S. Army Corps of Engineers (Corps or USACE) regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term “wetland” refers to areas meeting the Corps’s criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act, National Environmental Policy Act, and Endangered Species Act. These reviews require consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts.

Although the blunt-nosed leopard lizard is an upland species typically found in landscapes with limited jurisdictional waters under the Clean Water Act, the Corps has frequently assumed the role of the Federal nexus for both large and small projects in their entirety, even though these projects may only impact a minor amount of jurisdictional water. This approach by the Corps has facilitated numerous consultations under section 7 of the Act that would have otherwise likely required a section 10 permit.

Historically, the Corps interpreted “the waters of the United States” expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving “isolated” wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their “isolated” nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a “significant nexus” standard that may protect some, but not all, isolated wetland habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat, is not known at this time.

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law providing protection for this species. The Service’s responsibilities include administering the Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 **CFR** 402.02). A non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines "take" to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Service regulations (Service 2003) define "harm" to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 **CFR** 402.02). For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project's adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California's related Natural Community Conservation Planning program.

Conversion of land for agricultural purposes continues to be the most critical threat to listed species. Although the increment of habitat loss attributable to urban development appears to be increasing, these activities remain less significant than agriculture for most species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it usual for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

<u>Sikes Act</u>: The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the use of military installations to ensure the readiness of the Armed Forces. The INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically regulatory mechanisms because their implementation is subject to funding availability, they can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands.

Federal Land Policy and Management Act of 1976 (FLPMA): The Bureau of Land Management is required to incorporate Federal, State, and local input into their management decisions through Federal law. The FLPMA (Public Law 94-579, 43 U.S.C. 1701) was written "to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development and enhancement of the public lands; and for other purposes." Section 102(f) of the FLPMA states that "the Secretary [of the Interior] shall allow an opportunity for public involvement and by regulation shall establish procedures … to give Federal, State, and local governments and the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands." Therefore, through management plans, the Bureau of Land Management is responsible for including input from Federal, State, and local governments and the public. Additionally, Section 102(c) of the FLPMA states that the Secretary shall "give priority to the designation and protection of areas of critical environmental concern" in the development of plans for public lands. Although the Bureau of Land Management has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the Bureau of Land Management also has the ability under the FLPMA to establish and implement special management areas such as Areas of Critical Environmental Concern, wilderness, research areas, etc., that can reduce or eliminate actions that adversely affect species of concern (including listed species).

National Wildlife Refuge System Improvement Act of 1997: This act establishes the protection of biodiversity as the primary purpose of the National Wildlife Refuge system. This has lead to various management actions to benefit federally listed species.

Summary of Factor D

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1967. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

II.C.2.e. Factor E, Other natural or human made factors affecting its continued existence

Although the final rule listing for the blunt-nosed leopard lizard did not include a discussion of threats to the species, agricultural pesticides especially for control of beet leafhopper was identified as a threat near the time of listing (Montanucci 1965). Since the time of listing we have identified the following additional threats: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Furthermore, research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Altered vegetation communities (grazing, exotic grasses, wildfire regime)

The southern San Joaquin Valley of California, as with much of western North America, has been invaded by non-native plant species, since European cattle were brought to the region in the 1500s. Research has reported that the exponential increase in exotic plants has paralleled the increase in human population growth in California (Randall *et al.* 1998). The following exotic species are frequently observed within blunt-nosed leopard lizard habitat, and have adversely affected the species: *Bromus rubens madritensis* (red brome), *Vulpia myuros* (mouse tail fescue) *Schismus arabicus* (Arabian grass), *Hordium murinum glaucum* (foxtail), *Bromus diandrus* (ripgut brome), and *Bromus bordeaceus* (soft chess) (Biswell 1956; Heady 1977; Germano *et al.* 2001). The timing of germination for these introduced grasses is often earlier than most native species, which effectively gives the non-native species a competitive advantage over native plant species for water, nutrients, and sun light. Additionally, an overabundance of residual thatch from the previous year's non-native grass production can have similar adverse effects by shading out or obstructing native seedlings.

Vegetation changes include levels of biomass, cover, density, community structure, or soil characteristics. Changes have generally been attributed to the negative affects of off-highway vehicle use, overgrazing by domestic livestock, agriculture, urbanization, construction of roads and utility corridors, air pollution, military training exercises, and other activities (Lovich and Bainbridge 1999). These authors also reported that secondary contributions to degradation include the proliferation of exotic plant species, higher frequency of anthropogenic fire events, and increased nitrogen deposition. Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Introduced grasses and herbs often create an impenetrable thicket for small ground-dwelling vertebrates. Blunt-nosed leopard lizard movement is restricted in dense herbaceous cover, as observed with the ease of catching them by hand in dense grass compared to more open habitats (Germano *et al.* 2001; Germano *et al.* 2004). Radiotelemetry studies near the Elk Hills have documented that blunt-nosed leopard lizards are generally restricted to more open habitats (e.g. washes, roads, grazed pastures) when grass cover is thick, but they may utilize grassland areas if the herbaceous cover is sparse (Warrick *et al.* 1998).

The detrimental ecological effects of livestock grazing have been documented on western lands (Fleischner 1994; Noss 1994). Overgrazing may negatively affect blunt-nosed leopard lizards by soil compaction, damaging rodent burrows that the lizards depend on for cover, and stripping away vegetative cover used by both the lizard and its prey (Hansen *et al.* 1994). However, the cessation of grazing is likely to be even more detrimental to blunt-nosed leopard lizard due to the dense growth of exotic grasses as discussed below (Germano *et al.* 2001; Germano *et al.* 2005).

Long-term studies of blunt-nosed leopard lizard population trends on the Elkhorn Plain and Pixley NWR have shown dramatic declines in numbers following consecutive wet years (Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006). On Elkhorn Plain, the decline in blunt-nosed leopard lizard numbers was shown to occur with consecutive years of dense herbaceous cover above 0.65 ounces/ft^2 in the 1990s (Germano *et al.* 2004). Annual grazing studies in the Lokern area from 1997 to 2005 have demonstrated the benefits of livestock grazing in reducing exotic grasses and increasing blunt-nosed leopard lizard numbers (Germano *et al.* 2005). Therefore, recent decisions to severely restrict or eliminate livestock grazing from conservation lands may negatively affect blunt-nosed leopard lizards, especially during wet years (Germano *et al.* 2001). The BLM offices in Hollister and Bakersfield, California, are currently updating their Resource Management Plans (RMP) with respect to grazing in the Ciervo-Panoche areas and the Carrizo Plain National Monument, respectively. Grazing on the Carrizo Plain National Monument is particularly controversial.

Prescribed fire has been analyzed as an alternative habitat management tool, but in an unpublished study, it was less effective than grazing at controlling exotic grasses, and the positive effects lasted for less than one year (L. Saslaw *in litt.* 2006). Additionally, a prescribed burn had the unintended negative consequence of permanently removing native saltbush (Germano *et al.* 2001; Warrick 2006).

The preponderance of exotic grasses in blunt-nosed leopard lizard habitat in the San Joaquin Valley may be partly attributed to elevated levels of atmospheric nitrogen (N) deposition in ecosystems that are naturally N-limited. Weiss (1999) found that dry N deposition from smog in the San Francisco Bay Area has enabled the invasion of exotic annual grasses into native grasslands on nutrient-poor, serpentitic soils resulting in the loss of habitat for the federally threatened bay checkerspot butterfly (*Euphydras editha bayensis*). Other researchers found that increased levels of soil N from elevated atmospheric N deposition in the Mojave Desert could increase the dominance of exotic annual grasses and thereby raise the frequency of fire (Brooks 1999, 2003; Brooks and Pyke 2001).

Of the protected areas with management plans (see Table 1), grazing is employed as a management technique to reduce exotic weed infestations in the following areas:

- All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006);
- The entire Wind Wolves Preserve site is currently grazed by livestock (D. Clendenen, Wildlands Conservancy, pers. comm. 2006);
- The portion of the Semitropic Ridge Preserve administered by the CNLM is grazed by sheep (Warrick *in litt.* 2006), while none of the CDFG administered lands currently have any grazing leases;
- The 1,369 acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat;
- Less than one-fourth of the KWB Conservation Lands are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006).

<u>Vehicle strikes</u>
Blunt-nosed leopard lizard mortality is known to occur as a result of regular automobile traffic and ORV use (Tollestrup 1979b; Uptain *et al.* 1985; Williams and Tordoff 1988). Roads typically surround and often bisect remaining fragments of habitat, increasing the risk of mortality by vehicles and further isolating populations (Service 1998). The blunt-nosed leopard lizard's preference for open areas, such as roads (Warrick *et al.* 1998), makes them especially vulnerable to mortality from vehicle strikes. On May 22, 2005, a blunt-nosed leopard lizard was

reported killed by a vehicle strike on an access road in the Devils Den Oilfield of northwestern Kern County; the road is used by oilfield personnel and ranchers (Booher *in litt.* 2005). On July 19, 2006, a blunt-nosed leopard lizard was reported killed by a vehicle strike on an access road at the Carneros Devils Den area in Kern County, and also at the Kettleman Hills Middle Dome site in Kings County (Garcia *in litt.* 2006; BLM 2008).

During habitat conversion activities, individuals could be killed or injured by operation of heavy equipment (crushing, burial by earthmoving equipment, discing, grading, mowing) or flooding of habitat. Individuals could be harassed during construction by noise, ground vibrations and compaction of burrows, construction lighting, and disruption of foraging and breeding behavior. Individuals not killed directly by operation of equipment would probably find themselves in suboptimal habitat with a decreased carrying capacity due to lower availability of foraging and breeding habitat and greater vulnerability to predation. If individuals were displaced from converted lands into nearby native habitat population densities, intraspecific competition, and predation pressure would be likely to increase. Animals which lost their fear of humans could become more vulnerable to shooting, poisoning, and roadkill.

<u>Waterfowl blinds</u>

Waterfowl blinds are large drums dug part way into the ground and placed at the edges of playas to conceal hunters. When left uncovered, these structures are pitfall traps for blunt-nosed leopard lizards and other reptiles and small mammals resulting in their mortality. In 1991, six blunt-nosed leopard lizards were retrieved from waterfowl blinds around two playas at the Semitropic Ridge Preserve. In 1994, 10 blunt-nosed leopard lizards and 17 Tipton kangaroo rats were found dead in waterfowl blinds (Germano 1995). This author also recommended that hunting clubs should be informed of this problem and active waterfowl blinds should be covered when not in use; abandoned blinds should be removed or filled in. At this time, however, waterfowl blinds are only being retrofitted with covers, or removed on a case by case basis.

<u>Pesticides Use</u>

Pesticide use may directly and indirectly affect blunt-nosed leopard lizards (Jones and Stokes 1977; California Department of Food and Agriculture (CDFA) 1984; Service 1985; Williams and Tordoff 1988; Germano and Williams 1992b). The use of pesticides reduces food available for reproducing blunt-nosed leopard lizards in the spring, and later for hatchlings when they should be storing fat to sustain themselves during their first winter (Kato and O'Farrell 1986). The most expansive pesticide program within the range of the blunt-nosed leopard lizard is the broad-scale use of malathion. Malathion is a pesticide regulated by the California Department of Food and Agriculture, and is typically aerially distributed across much of the blunt-nosed leopard lizard range to reduce impacts of the curly top virus on sugar beet production. The most important effect of malathion upon blunt-nosed leopard lizard survival and recovery is the associated reduction in insect prey populations which can last between 2 to 5 days (CDFA 1984).

In a 2000 biological opinion, the Service authorized the renewal of a five-year pesticide use permit to CDFA for use of malathion which included measures to protect the blunt-nosed leopard lizard (Service 2000). These measures allow the aerial application of malathion in some blunt-nosed leopard lizard conservation areas prior to April 15 and after October 15; thus, avoiding the primary blunt-nosed leopard lizard activity period. Notably, in 2006 CDFA treated 53,965 acres with malathion in Kern, Kings, and Fresno Counties (CDFA 2006). The CDFA pesticide use permit for malathion is currently being revised through formal consultation with the Service. Other unregulated pesticides (e.g., common household pyrethroids [California Department of Pesticide Regulation 2006; Keith 2006]) likely pose additional threats to blunt-nosed leopard lizards by reducing insect prey populations. One recent study on the effects of malathion on insect abundance showed a significant decline in the number of ants in malathion-treated plots relative to control plots (Redak 2006); ants are a likely food source for blunt-nosed leopard lizards. Germano *et al.* (2007) reported that the effects of spraying malathion within blunt-nosed leopard lizard habitat remained largely speculative, but warrant expeditious research.

Fumigating rodents in burrows may also harm blunt-nosed leopard lizards that shelter in those burrows (Hansen *et al.* 1994). The U.S. Environmental Protection Agency (USEPA) bulletins governing use of rodenticides have greatly reduced the risk of significant mortality to blunt-nosed leopard lizard populations. The California EPA, CDFA, county agricultural departments, CDFG, and the USEPA collaborated with the Service in the development of County Bulletins that both are efficacious and acceptable to land owners (Service 1998). However, the use of rodenticides in blunt-nosed leopard lizard habitat continues to be a potential threat to the species as this effectively reduces the number of rodents available to dig burrows for secondary use by blunt-nosed leopard lizards.

<u>Climate change</u>
Long-term monitoring studies (Germano *et al.* 1994; Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006) show that blunt-nosed leopard lizard populations drastically decline during consecutive years of drought or above average precipitation. Also, blunt-nosed leopard lizard aboveground activity is highly dependent upon temperature. Optimal activity occurs when air temperatures are 74 to 104 degrees Fahrenheit and ground temperatures are 72 to 97 degrees Fahrenheit (Service 1985, 1998). Therefore, blunt-nosed leopard lizard population stability and behavior is very sensitive to any changes in precipitation or temperature. Climate models predict for California an overall warming of 3.0 to 10.4 degrees Fahrenheit by 2100 (Cayan *et al.* 2006) but vary in their predictions for precipitation. VanRheenen *et al.* (2004), however, predicts a decrease in precipitation in the southern San Joaquin. Any significant changes in temperature or precipitation could have drastic effects on blunt-nosed leopard lizard populations. Climate change will likely result in changes in the vegetative communities of blunt-nosed leopard lizard habitat and potentially increase exotic species. However, there is insufficient data available at this time to predict the effects of climate change on the blunt-nosed leopard lizard.

Summary of Factor E
In summary the following threats, since the time of listing the following additional threats to the blunt-nosed leopard lizard have been identified: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. These on-going threats pose additional challenges to successful blunt-nosed leopard lizard recovery.

II.D. Synthesis

At the time the species was listed, conversion of natural habitat into agricultural lands in the San Joaquin Valley resulted in the reduction of blunt-nosed leopard lizard habitat to less than 15 percent of its historic range (Service 1985; Germano and Williams 1992a; Jennings 1995). Remaining habitat is highly fragmented and confined to a few scattered areas from southern Merced County to western Kern County (Hansen *et al.* 1994). The blunt-nosed leopard lizard continues to be threatened by degradation to its habitat from the on-going modification and conversion of existing habitat to agriculture, petroleum and mineral extraction, residential and commercial development. In addition, altered vegetation communities (due to grazing, nonnative grasses, and altered wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, rodenticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Although some progress in recovery of the species has been made within the southern range of blunt-nosed leopard lizard, the majority of the recovery criteria outlined in the Recovery Plan have not been achieved (see Table 1). The downlisting criteria for the blunt-nosed leopard lizard require the protection of at least 5,997 acres of contiguous habitat in five specified recovery areas representing the geographic range of the species (three in the foothills and two on the Valley floor). Also required for each protected area is the stability of the population (greater than 2 blunt-nosed leopard lizards per hectare through a precipitation cycle) and the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. Only in the Carrizo Plain Natural Area is the acreage requirement surpassed with the establishment of the Carrizo Plain National Monument; however, long-term population surveys show significant declines in the population during wet years. The 5,278 acre Semitropic Ridge Preserve approaches the acreage requirement for Valley floor habitat in Kern County, but blunt-nosed leopard lizard population densities there are too low. Blunt-nosed leopard lizard habitat is protected in smaller fragments in the foothills of western Kern County and the Ciervo-Panoche area; however, there are no preserves protecting blunt-nosed leopard lizard populations on the Valley floor in Merced or Madera Counties. Therefore, the downlisting criteria have not been met.

In summary, based on the lack of protection of sufficient habitat representing the geographic range of the species, the low density and instability of the populations, and the continuation of threats to the species, we conclude that the blunt-nosed leopard lizard continues to meet the definition of endangered, and is in danger of extinction throughout its known range.

III. RESULTS

III.A. Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
  ____ *Extinction*
  ____ *Recovery*
  ____ *Original data for classification in error*
__X__ No change is needed

III.B. New Recovery Priority Number __N/A__

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

The five most important actions that should be taken within the next five years to facilitate the recovery of the blunt-nosed leopard lizard include:

1. Facilitate research on the effects of solar projects on blunt-nosed leopard lizard behavior and compatibility.
2. Establish corridors between existing natural areas in Kern and Tulare Counties (i.e., Buena Vista Valley, Elk Hills, Lokern Natural Area, Buttonwillow ER, Semitropic Ridge Preserve, Kern NWR, Allensworth ER, Pixley NWR) (Service 1998; Selmon *in litt.* 2006) to enhance the metapopulation recovery strategy.
3. Establish a preserve or conservation easement on the natural lands of Madera Ranch in western Madera County (Service 1998). Protect blunt-nosed leopard lizard habitat in the Panoche Valley and in dispersal corridors in western Fresno County—Panoche Creek and Silver Creek (Service 1998; Lowe *et al.* 2005), Anticline Ridge, the western rim of Pleasant Valley, Guijarral Hills, and the north end of the Kettleman Hills (Service 1998).
4. Include the flexibility to alter the dates and stocking rates of livestock within all RMP where blunt-nosed leopard lizards have potential to occur, including the Carrizo Plain National Monument RMP, Bakersfield RMP, Caliente RMP and Hollister RMP to adaptively manage annual plant production and prevent the dominance of exotic grasses in blunt-nosed leopard lizard habitat (Germano *et al.* 2001); grazing prescriptions should be tailored to suit the ecological needs specific to the area.
5. Coordinate with hunting clubs for blunt-nosed leopard lizard protection: active waterfowl blinds should be covered when not in use, and abandoned blinds should be removed or filled in to prevent entrapment of blunt-nosed leopard lizard and other wildlife (Germano 1995).

Other important actions that are important to facilitate blunt-nosed leopard lizard recovery include the following items.

Kern County--completion of HCPs and issuance of incidental take permits

- Complete the Kern County Valley Floor HCP
- Complete the Chevron Lokern HCP
- Complete the Oxy of Elk Hills HCP
- Encourage Crimson Resource Management to start an HCP or section 7 formal consultation to protect lands in Buena Vista Valley, NPR-2, and Buena Vista Hills

Habitat management
- Assist the Lokern Coordination Team in the development of the 44,000-acre Lokern Natural Area in western Kern County

Future research and monitoring
- Continue long-term monitoring of population trends on the Valley floor (e.g., Pixley NWR, Lokern Natural Area, Semitropic Ridge Preserve, Buttonwillow ER) and in the foothills (e.g., Carrizo Plain Natural Area , Elk Hills) (Germano and Williams 1992b; Service 1998)
- Census and monitor blunt-nosed leopard lizard populations in western Madera County, central Merced County, and the Ciervo-Panoche Natural Area (Service 1998)
- Study the effects of grazing on blunt-nosed leopard lizard along precipitation gradients in the Elkhorn and Carrizo Plains to determine appropriate grazing prescriptions specific for each area
- Facilitate research on the effects of CVPCP and CVPIA programs on blunt-nosed leopard lizard recovery. Study the effects of translocation (e.g., Allensworth ER) and agricultural land retirement (e.g., Tranquility and Atwell Island sites) on blunt-nosed leopard lizard (Service 1998; Germano and Williams 1992b; Selmon *in litt.* 2006)
- Assess potential effects of malathion upon the prey base of the blunt-nosed leopard lizard (Germano *et al.* 2007) and apply findings to the CDFA Curly Top Virus Control Program.

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Appendix A—Analysis of downlisting Criteria for Blunt-nosed Leopard Lizard 5-Year Review

Summary

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 – 640-acre parcels. Within the Ciervo-Panoche Natural Area, two ACECs separated by 2 miles protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. Within the foothills of western Kern County, the Oxy conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area , but not in the four other specified recovery areas.

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern NWR; Pixley NWR; the CNLM lands at Semitropic Ridge Preserve; the CNLM, PXP, and BLM lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM lands of the Carrizo Plain National Monument; the Coles Levee Ecosystem Preserve; and KWB Conservation Lands. Therefore, the downlisting criterion for the approval and implementation of a management plan in all protected areas is partly achieved.

Lastly, the downlisting criteria require population stability in the protected areas with the mean population density remaining above 2 per hectare through one precipitation cycle. Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR (Figure 3) while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. There is not sufficient data available at this time to determine whether the Ciervo-Panoche Natural Area or any of the other protected areas achieve the population stability criteria. Therefore, the downlisting criterion for population stability has not been achieved for any of the specified recovery areas.

Analysis of Recovery Criteria

1. *Protection of five or more areas, each about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat, as follows:*

Summary

The downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat has been achieved in the following areas:

- Foothills of the Carrizo Plain Natural Area

Whereas currently the downlisting criterion for blunt-nosed leopard lizard habitat protection has yet to be met for the following areas:

- Valley floor in Merced or Madera Counties
- Valley floor in Tulare or Kern Counties
  - *Semitropic Ridge Preserve*
  - *Kern National Wildlife Refuge*
  - *Lokern Natural Area*
  - *Buttonwillow Ecological Reserve*
  - *Coles Levee Ecological Preserve (CLEP), Kern Water Bank (KWB) Conservation Lands, and the Tule Elk State Reserve*
  - *Pixley National Wildlife Refuge*
  - *Allensworth Ecological Reserve*
- Foothills of the Ciervo-Panoche Natural Area
- Foothills of western Kern County
  - *Elk Hills Conservation Area*
  - *Naval Petroleum Reserve #2*
  - *Wind Wolves Preserve*

Assessment

Valley floor in Merced or Madera Counties
There are no large preserves in Merced or Madera Counties containing significant populations of blunt-nosed leopard lizard. The preserves in western Merced County (e.g. Grasslands Ecological Area, roughly 179,000 acres) are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.* 2006). Therefore, the downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat on the Valley floor in Merced or Madera Counties has not been met.

Valley floor in Tulare or Kern Counties
Several large preserves have been established on the Valley floor in Tulare and Kern Counties containing populations of blunt-nosed leopard lizard (Figure 2). These preserves include Semitropic Ridge Preserve, Kern National Wildlife Refuge (NWR), Lokern Natural Area, Buttonwillow Ecological Reserve (ER), Coles Levee Ecosystem Preserve, Kern Water Bank (KWB), Tule Elk State Reserve, Pixley NWR, and Allensworth ER.

Semitropic Ridge Preserve
The Semitropic Ridge Preserve currently protects about 5,278 acres—comprised of 3,093 acres administered by the Center for Natural Lands Management (CNLM), and 2,185 acres administered by CDFG—of contiguous blunt-nosed leopard lizard habitat on the Valley floor of northwestern Kern County (Cypher *in litt.* 2006, Kern County Recorder 2006, Warrick *in litt.* 2006). About 570 acres of CDFG land west of Goose Lake Canal was excluded from the calculation of contiguous lands at Semitropic Ridge because the canal acts as a barrier to blunt-nosed leopard lizard movement (Warrick *in litt.* 2006). Another 120-acre parcel is currently in escrow for the CDFG (Peterson-Diaz *in litt.* 2006), which when protected would bring the total acres of contiguous lands to 5,398 acres. Therefore, the Semitropic Ridge Preserve comes close to the 5,997-acre downlisting criterion; however, only about 1,500 acres of the preserve meet the criterion of maintaining a blunt-nosed leopard lizard population density of greater than 2 per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criteria for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties and population stability has not been met.

Kern National Wildlife Refuge
The Kern NWR is located in northwestern Kern County about 4 km (2.5 miles) north of the Semitropic Ridge Preserve. The majority of the Kern NWR is seasonally flooded and does not provide habitat for blunt-nosed leopard lizard. About 2,000 acres of Kern NWR are considered to be potential blunt-nosed leopard lizard habitat; however, there have been no confirmed sightings of blunt-nosed leopard lizard there since 1996 (Williams *in litt.* 2006). Surveys for blunt-nosed leopard lizard were conducted in the 1,369-acre Research Natural Area (Units 11 and 12) in 2001 and 2004, but none were found. In the summer of 2006, surveys were conducted in the recently acquired 631-acre Unit 15, which contains better quality blunt-nosed leopard lizard habitat than Units 11 and 12, but no blunt-nosed leopard lizard were observed there either. More intensive surveys are planned for 2007 (Williams *in litt.* 2006), though at the time of this review, results had not been obtained. Therefore, the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties has not been met.

Lokern Natural Area
The Lokern Natural Area is located in western Kern County about 23 km (14.5 miles) south of the Semitropic Ridge Preserve. Currently, 13,160 acres of the Lokern area are protected on Federal or State lands or under conservation easements. The protected Lokern lands include Bureau of Land Management (BLM) lands (3,858 acres), Center for Natural Lands Management (CNLM) lands (3,332 acres), CDFG lands (968 acres), and Plains Exploration & Production Company (PXP; 840 acres) and Occidental of Elk Hills, Inc. (Oxy; 4,162 acres) conservation lands (Service 1995; Nuevo Energy Company and Torch Operating Company 1999; Kern County Recorder 2006; Quad Knopf 2006; G. Warrick, CNLM, pers. comm. 2006). The protected lands, however, are highly fragmented into parcels ranging in size from 10 to 640 acres creating a checkerboard pattern of protected lands. The largest block of contiguous protected lands in the Lokern

area is 2,882 acres of Oxy conservation lands (Elk Hills Conservation Area) at the southern end of the Lokern area on the North Flank of the Elk Hills. Therefore, the downlisting criterion for contiguous land protection the Valley floor of Kern or Tulare Counties has not been met.

Chevron USA, Inc. (Chevron), the largest landowner in the Lokern area (17,329 acres), owns the intervening 640-acre sections of the checkerboard pattern of protected lands in the Lokern Natural Area. The draft Chevron Lokern Habitat Conservation Plan (Chevron, *in prep.*, 2008) proposes to protect 11,143 acres in the Lokern area and limit permanent disturbance of its undeveloped Lokern lands to 10 percent per 640-acre section, and temporary disturbance to an additional 5 percent. In total approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. On August 17, 2006, Chevron reasserted its commitment to complete the proposed HCP and proceed with acquiring and/or protecting the proposed habitat lands (G. Scott, Chevron, pers. comm. 2006). Still, until the HCP is finalized the habitat loss and protection associated with the proposed HCP remains speculative.

Buttonwillow Ecological Reserve
The Buttonwillow ER is located in western Kern County about 21 km (13 miles) southeast of the Semitropic Ridge Preserve and 16 km (10 miles) east-northeast of the Lokern Natural Area. The Buttonwillow ER protects about 1,350 acres of contiguous blunt-nosed leopard lizard habitat. Buttonwillow ER contains one of the largest and most stable blunt-nosed leopard lizard populations (Selmon *in litt.* 2006). Due to the small size of the preserve, however, the Buttonwillow ER does not meet the downlisting criterion for contiguous land protection.

Coles Levee Ecological Preserve, Kern Water Bank Conservation Lands, and the Tule Elk State Reserve
The 6,059-acre Coles Levee Ecosystem Preserve (CLEP), 4,263-acre Kern Water Bank (KWB) Conservation Lands, and 969-acre Tule Elk State Reserve are contiguous protected areas in western Kern County located east of the Elk Hills. However, blunt-nosed leopard lizard movement among and within the three preserves is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119.

The California Aqueduct bisects the CLEP creating a barrier to blunt-nosed leopard lizard movement and partitioning the preserve into about 1,280 acres to the west and 4,779 acres to the east. Additionally, portions of the CLEP are highly disturbed by high-density oil and gas drilling activities. Although the permit for CLEP HCP (ARCO Western Energy 1995) is not currently valid—as the current land owner, Aera Energy LLC, failed to initially comply with the terms of the HCP—the area is still managed according to its initial conservatory intent. Notably, no blunt-nosed leopard lizards have been observed at CLEP in recent years (Quad Knopf 2005; J. Jones, Quad Knopf, pers. comm. 2006).

Interstate 5 acts as a barrier to blunt-nosed leopard lizard movement and divides the KWB Conservation Lands into 2,589-acre and 1,674-acre parcels (Jones *in litt.* 2006).

The KWB Conservation Lands are protected under the KWB Authority HCP (KWB Authority 1996) and associated biological opinion (Service 1997). However, there are no records of blunt-nosed leopard lizard on the KWB Conservation Lands except for blunt-nosed leopard lizard introductions (Jones *in litt.* 2006, KWB Authority 2006). Although protocol-level blunt-nosed leopard lizard surveys have not been conducted on the KWB lands, these lands have had numerous other reconnaissance and meandering surveys over the years. Given the repetitive negative results from all of these surveys, the blunt-nosed leopard lizard is considered absent from the area (Jones *in litt.* 2006).

Therefore, due to the lack of blunt-nosed leopard lizard sightings and the barriers to blunt-nosed leopard lizard movement among and within the three preserves—Coles Levee Ecological Reserve, Kern Water Bank Conservation Lands, and Tule Elk State Reserve—the downlisting criterion for the Valley floor of Kern or Tulare Counties.

Pixley National Wildlife Refuge
The 6,833-acre Pixley NWR in southwestern Tulare County is divided into three large sections and several smaller sections; all parcels, with one exception, are separated by at least 1.6 km (1 mile). The largest section (Pixley-Main) covers 4,445 acres, but less than 3,000 acres are considered suitable habitat for blunt-nosed leopard lizard due to seasonal flooding of the wetlands and dense vegetative growth. The second largest section (Los Feliz) is roughly 1,476 acres. Very little reconnaissance has been done in this area, however given that the entire area is grazed it is speculatively considered potential blunt-nosed leopard lizard habitat as suitable vegetation conditions may be present. The third largest section (Horse Pasture) contains 800 acres of potential blunt-nosed leopard lizard habitat although the presence of blunt-nosed leopard lizard has not been documented (Williams *in litt.* 2006). In summary, the largest contiguous block of blunt-nosed leopard lizard habitat at Pixley NWR is 3,000 acres; thus, this downlisting criterion has not been met.

Allensworth Ecological Reserve
The Allensworth ER is owned by CDFG and located in southwestern Tulare County. This ER contains four large blocks of land containing suitable habitat for the species. However, the blocks are separated from each other and do not form contiguous habitat as required by this downlisting criterion. The largest block totals 2,482 acres and is not large enough by itself to meet the recovery goal of 5,997 acres of contiguous blunt-nosed leopard lizard habitat. In addition, the blunt-nosed leopard lizard population at Allensworth Ecological Reserve has been declining over the past 15 years (Selmon, pers. comm. 2006). Therefore, this recovery criterion has not been met for the Valley floor of Kern or Tulare Counties.

The sizes of the blocks are 2,482 acres, 1,432 acres, 551 acres, and 536 acres. The largest block is located about 3 km (1.9 miles) southeast of the Pixley-Main section of the Pixley NWR. The second largest and southernmost block is located about 5 km (3.1 miles) southwest of the largest block and about 18 km (11.2 miles) northeast of Kern NWR. Habitat planning goals include connecting the blocks of natural lands at Allensworth ER with Pixley NWR through land acquisition and retirement of agricultural fields; however, Deer Creek acts a barrier to blunt-nosed leopard lizard movement along the southern boundary of Pixley-Main (P. Williams, Kern NWR Complex, pers. comm. 2006). The number of blunt-nosed leopard lizards at Allensworth ER has also declined over the past 15 years (Selmon *in litt.* 2006). In summary, the largest block at Allensworth ER is 2,482 acres and is not sufficient to meet this downlisting criterion for the Valley floor of Kern or Tulare Counties.

<u>Foothills of the Ciervo-Panoche Natural Area</u>
The BLM owns about 34,000 acres in the Ciervo-Panoche Natural Area that are considered to be blunt-nosed leopard lizard habitat (Lowe 2006). However, only the Areas of Critical Environmental Concern (ACECs) have regulatory protection under the Federal Land Policy and Management Act of 1976. The BLM allows oil and gas leasing with limited surface use stipulations for threatened and endangered species on the four ACECs (BLM 1984, 1997) and thus confer some protection to approximately 16,600 acres of blunt-nosed leopard lizard habitat (Terry 2006).

Some of the best blunt-nosed leopard lizard habitat in the region, however, remains unprotected on private lands in the Panoche Valley and near Silver Creek. Only 3 of the 21 (14 percent) reported occurrences of blunt-nosed leopard lizard are within an ACEC (CNDDB 2006; Lowe *in litt.* 2006). Much of the rest of the Ciervo-Panoche Natural Area is not suitable habitat for blunt-nosed leopard lizard due to dense vegetative cover and clay soils (Lowe *in litt.* 2006; L. Saslaw, pers. comm. 2006). Since the largest protected block of blunt-nosed leopard lizard habitat is 4,800 acres, it does not meet this downlisting criterion for the foothills of the Ciervo-Panoche Natural Area.

<u>Foothills of western Kern County</u>
The foothills of western Kern County contain blunt-nosed leopard lizard habitat on both public and private lands. Protected areas and other public lands containing blunt-nosed leopard lizard habitat occur in the Elk Hills, Naval Petroleum Reserve #2 (NPR-2), and the Wind Wolves Preserve.

Elk Hills Conservation Area
The Oxy conservation lands (Elk Hills Conservation Area) consist of 4,162 acres on the North Flank of the Elk Hills near Lokern and another 3,770 acres in the Buena Vista Valley (Buena Vista Valley) along the southern edge of the Elk Hills. Within the North Flank, only 2,882 acres (mentioned above in the Lokern Natural Area) are contiguous. All 3,770 acres of the Oxy conservation lands in the Buena Vista Valley area are contiguous (Quad Knopf 2006) but are not sufficient to meet this downlisting requirement.

Currently, Oxy has proposed an Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) that would permit an additional permanent disturbance of up to 4,000 acres and temporary disturbance of up to 3,000 acres within Elk Hills for oil and gas development. The HCP proposes to preserve 81.8 percent (roughly 38,780 acres) of the 47,409-acre Elk Hills NPR-1 (Live Oak & Associates, Inc., *in litt.* 2009). Until the HCP is finalized and the Service issues the incidental take permit, habitat loss and protection associated with the proposed HCP is speculative.

Naval Petroleum Reserve #2
The BLM owns approximately 9,000 acres in NPR-2 and Buena Vista Valley, mostly in a checkerboard of 640-acre parcels. In 2003 the Service programmatic biological opinion (#1-1-01-F-0063) which covered oil and gas extraction activities on BLM lands was amended to include NPR-2 (Service 2003). However, even though the limits disturbance of high quality habitat (Red Zone Lands) to less than 10 percent per 640-acre section and lower quality habitat (Green Zone Lands) to less than 25 percent (Service 2001), residual habitat on BLM lands has been degraded by past oil and gas exploration activities. Unfortunately, several sections within NPR-2 had already exceeded the disturbance thresholds when the BLM acquired the properties. The biological opinion also limits total permanent disturbance of blunt-nosed leopard lizard habitat on BLM lands throughout Kings and Kern Counties to 180 acres (Service 2001, 2003). Since the BLM lands at NPR-2 are highly fragmented they do not meet the downlisting criterion for the foothills of western Kern County.

Wind Wolves Preserve
About 2,000 acres of potential blunt-nosed leopard lizard habitat is protected on the edge of the large Wind Wolves Preserve. Wildlands Conservancy, a non-profit group, purchased this southwestern Kern County site in 2001. In the early 1990s a blunt-nosed leopard lizard sighting was reported in the Preserve at Rincon Flat near Interstate 5 (CNDDB 2006). However, no blunt-nosed leopard lizards have been observed on the Preserve since that initial report. The 2,000 acres of potential blunt-nosed leopard lizard habitat do not meet the downlisting criterion for the foothills of western Kern County.

Foothills of the Carrizo Plain Natural Area
The 250,000-acre BLM Carrizo Plain National Monument and adjacent CDFG Ecological Reserve protect blunt-nosed leopard lizard populations on the Carrizo Plain Natural Area (about 55,000 acres) and roughly 1,000 acres of the Upper Cuyama Valley (Saslaw *in litt.* 2006). These lands meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat in the foothills of the Carrizo Plain Natural Area.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

Summary

The downlisting criterion for an approved and implemented management plan that includes the continued survival of blunt-nosed leopard lizard as an objective has been met for the following protected areas:

- CNLM lands of the Semitropic Ridge Preserve

- CNLM, PXP, and BLM lands of the Lokern Natural Area
- Oxy lands of the Elk Hills Conservation Area
- Kern and Pixley NWRs
- BLM Hollister RMP
- BLM, TNC, and CDFG lands of the Carrizo Plain National Monument

All other protected areas, including CDFG lands of the Semitropic Ridge, California State Parks Tule Elk State Reserve, Buttonwillow Ecological Reserve Allensworth Ecological Reserve, and Wind Wolves Preserve have not currently been drafted, or do not include the continued survival of the blunt-nosed leopard lizard as an objective. A joint-management plan for the Carrizo Plain Natural Area—Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered by the Nature Conservancy (TNC)—and, the Caliente RMP are also currently being revised. Therefore, the downlisting criterion is only partly met.

Assessment

The CNLM lands of the Semitropic Ridge Preserve and Lokern Natural Area have an approved management plan with a management goal to "prevent the extinction of threatened and endangered species through maintenance of high quality native habitat which supports viable, self-sustaining populations" (Warrick *in litt.* 2006). The Semitropic Ridge Preserve is grazed by sheep to control exotic grasses but the grazing is not very effective during unusually wet years (Warrick *in litt.* 2006). None of the CDFG lands currently have an approved management plan (E. Cypher, pers. comm. 2006; S. Juarez, CDFG, pers. comm. 2006). CDFG does not have any grazing leases for its lands at Semitropic Ridge but would like to at some point (Warrick *in litt.* 2006). Therefore, the criterion has been met for the CNLM lands at Semitropic Ridge and Lokern but not for the CDFG lands.

The Kern NWR and Pixley NWR both have management plans that include the survival of blunt-nosed leopard lizard as an objective. The 1,369-acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*). Approximately 2,890 acres of Pixley-Main has been designated as endangered species habitat. All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006). Therefore, this criterion has been met for the Kern and Pixley NWRs.

The Caliente Resource Management Plan (RMP) (BLM 1997) covers all BLM lands under the jurisdiction of the Bakersfield field office, but not the more recently acquired NPR-2 lands. The management plan includes the survival of listed species including blunt-nosed leopard lizard as an objective. The BLM is currently revising its Caliente RMP. The new RMP will include NPR-2 and will also provide measures for the protection of the blunt-nosed leopard lizard (L. Saslaw, BLM, pers. comm. 2006). Therefore, the downlisting criterion has been met for the BLM lands under the jurisdiction of the Bakersfield office, except for NPR-2.

The Carrizo Plain Natural Area Management Plan (BLM 1996) established the cooperative management of the 250,000 acres within the Carrizo Plain Natural Area, comprised of: the Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered

TNC. This joint-management plan includes measures for the protection of blunt-nosed leopard lizard. The BLM is currently preparing the Carrizo Plain National Monument RMP that will specifically address management of the Carrizo Plain National Monument (L. Saslaw, pers. comm. 2006). The draft RMP and Environmental Impact Statement (EIS) are currently in preparation, and are expected to be available for public review in fall 2009. Concurrently CDFG is revising its management plan for the protection of blunt-nosed leopard lizard within the Carrizo Plain ER (Stafford *in litt.* 2007). Based on the approval and implementation of the pending revision for the joint-management plans of the Carrizo Plain Natural Area, the downlisting criterion has been met for the BLM, CDFG, and TNC lands of the Carrizo Plain National Monument.

Service biological opinion (file number 1-8-07-F-19) for the revised Hollister RMP was issued in June 2007 (Service 2007), and the RMP was finalized on September 7, 2007. This plan established resource management goals for areas where blunt-nosed lizard habitat was known or had potential to occur, including: the Panoche Hills management unit has approximately 7,800 acres of habitat for sensitive species in the plateau area; and, the Griswold/Tumey Hills management unit includes 2,500 acres of habitat areas for sensitive species in the plateau area in the northern Tumey Hills. Blunt-nosed leopard lizards have been observed on private lands adjacent to the Tumey Hills management unit in the eastern Panoche valley. Lastly, the Coalinga management unit has 14,660 acres designated for sensitive species, including the blunt-nosed leopard lizard. Given BLM's commitment to implement the resource management goals, the biological opinion permitted BLM to take blunt-nosed leopard lizards or impact its habitat by conducting its grazing management, energy and minerals program, vegetation management program, and transportation program. The Hollister RMP therefore achieves this downlisting criterion.

Oxy is currently managing its 7,801 acres of conservation lands (Elk Hills Conservation Area) in Lokern and the Buena Vista Valley for the survival of blunt-nosed leopard lizard and other listed species in accordance with the Elk Hills biological opinion (Service 1995) and the 1998 Conservation Management Agreement. Also within the Elk Hills area, Berry Petroleum was authorized under the North Midway Sunset biological opinion (Service 2006) to develop a management plan that includes the survival of blunt-nosed leopard lizard as an objective for its 1,725 acres of conservation lands in Lokern, Buena Vista Valley, and Midway Valley. Therefore, the downlisting criterion has been met for the Elk Hills Conservation Area, but not yet for the Berry Petroleum lands.

The PXP, Coles Levee, and KWB Authority HCPs contain management plans which include the survival of blunt-nosed leopard lizard as an objective in the Lokern Natural Area, Coles Levee Ecosystem Preserve, and KWB Conservation Lands, respectively (ARCO Western Energy 1995; KWB Authority 1996; Nuevo Energy Company and Torch Operating Company 1999). Less than one-fourth of the KWB Conservation Lands, however, are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006). Chevron and Oxy are currently preparing HCPs for their lands in the Lokern area and Elk Hills, respectively; however, it is unknown when the HCPs will be finalized and approved. Additionally, no management plans have been implemented for blunt-nosed leopard lizard habitat on private lands in the Ciervo-Panoche Natural Area and in western Kern County.

Therefore, the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective has been met for the PXP conservation lands in Lokern but not for the Chevron or Oxy lands (outside of the Elk Hills Conservation Area).

In the Lokern area, an interagency cooperative acquisition and management plan for the conservation of the 44,000-acre Lokern Natural Area is in draft form. Participants include Federal agencies (BLM, Service), State agencies (CDFG, California Energy Commission, California State University Bakersfield), private environmental groups and biological consulting firms (The Nature Conservancy [TNC], CNLM, ESRP, McCormick Biological, Inc.), and private oil companies (Chevron; Oxy; Aera Energy, LLC [Aera]; PXP) (Service 1998). The parties periodically meet to coordinate their efforts, but there is no estimate for when the Lokern Natural Area management plan will be approved and implemented. Therefore outside of the CNLM and PXP conservation lands, the recovery criterion has not been met for the Lokern Natural Area.

In summary, only the CNLM lands of the Semitropic Ridge Preserve, the CNLM, PXP, and BLM lands of the Lokern Natural Area, the Oxy lands of the Elk Hills Conservation Area, the Kern and Pixley NWRs, and the BLM, TNC, and CDFG lands of the Carrizo Plain National Monument have a management plan for blunt-nosed leopard lizard that has been approved and implemented. The management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion is only partly met.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle*.

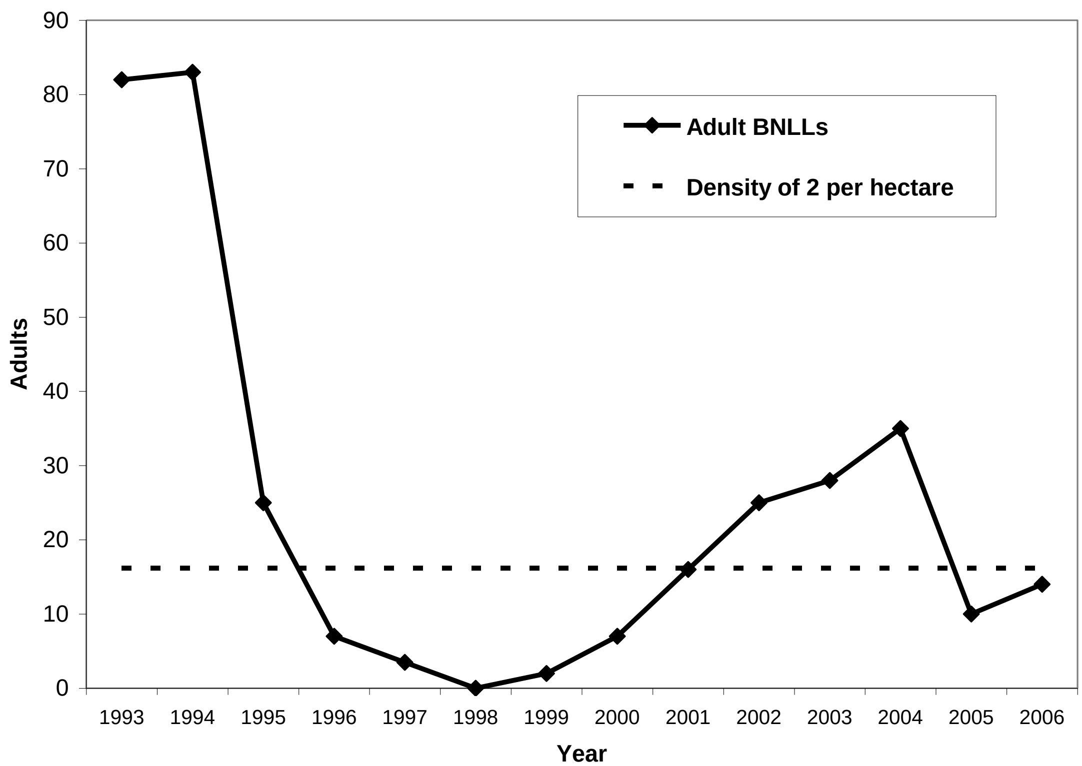
Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004, Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005, Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley NWR (ESRP, Williams *in litt.* 2006), Buttonwillow ER, and Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). However, long-term population studies have not been conducted for blunt-nosed leopard lizard in the Cuyama Valley, the Ciervo-Panoche area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

Pixley NWR

Figure 3 illustrates the population instability of blunt-nosed leopard lizard at Pixley NWR. Spring surveys of adult blunt-nosed leopard lizards from 1993 to 2006 show that the density was below 2 per hectare from 1996 to 2000 during years of above average precipitation. No blunt-nosed leopard lizards were found during surveys in 1998 due to flooding. Blunt-nosed leopard lizard numbers increased from 2001 to 2004 during years of below average precipitation but declined again below 2 per hectare during the wet years 2005 to 2006. Previous short-term studies observed blunt-nosed leopard lizard population densities at Pixley NWR of 0.3 to 10.8 per hectare (Uptain *et al.* 1985), 3.3 per hectare (Tollestrup 1979), and 6.7 to 7.0 per hectare (Williams and Germano 1991). In summary, due to the decline in blunt-nosed leopard lizard numbers during wet years, this downlisting criterion has not been met at Pixley NWR.

Elkhorn Plain
ESRP has monitored population trends of blunt-nosed leopard lizards on the Elkhorn Plain biannually since 1989 (Williams *et al.* 1993; Germano *et al.* 2004; Germano and Williams 2005). From 1989 to 1994, the population density ranged from 4.9 to 20.2 adults per hectare, except for 1990 when the density decreased to 1.7 adults per hectare following two years of severe drought. Then, after several years of above average precipitation, the population density of blunt-nosed leopard lizard decreased in 1995 and remained between 1.7 to 4.9 adults per hectare through 2003. The density remained below 1.8 adults per hectare during the wettest years from 1998 to 2000. Therefore, due to the decline in blunt-nosed leopard lizard numbers during consecutive wet years or years of severe drought, this downlisting criterion has not been met on the Elkhorn Plain.

Figure 3, The number of adult blunt-nosed leopard lizards observed during spring surveys on the Deer Creek West 20-acre plot, Pixley National Wildlife Refuge, Tulare County (Source: ESRP, Williams *in litt.* 2006)



Kern County Valley floor
The largest and most stable population of blunt-nosed leopard lizard is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 (Selmon *in litt.* 2006). At Semitropic Ridge Preserve, road surveys during May and June, 2005, found an average of 6 blunt-nosed leopard lizards per 32-km (20-mile) survey (Warrick 2006), which is far below the criterion for 2 blunt-nosed leopard lizards per hectare. Road surveys, however, are likely overestimates of blunt-nosed leopard lizard population density in an area because of the preference of the species for roads (Warrick *et al.* 1998; Warrick *in litt.* 2006). Additionally, the land manager at Semitropic Ridge Preserve stated that only about 1,500 acres of the preserve comes close to supporting a population density of 2 blunt-nosed leopard lizards per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the Semitropic Ridge Preserve. No population density estimates are available at this time for Buttonwillow ER. Blunt-nosed leopard lizard numbers at Allensworth ER are reported to have declined over the past 15 years (Selmon *in litt.* 2006), but no data are available at this time.

At Lokern, road surveys in May and June, 2005, observed an average of 32.7 blunt-nosed leopard lizards per 82-km (51-mile) survey (Warrick 2006). Therefore, the population density estimate—ranging from 0.40 to 1.33 blunt-nosed leopard lizards per hectare—is well below the recovery criterion (Warrick *in litt.* 2006). Additionally, grazed and ungrazed plots on the Lokern were surveyed annually between 1997 to 2005, using a 10-day census survey method. These results indicated that the density of blunt-nosed leopard lizards on ungrazed plots remained less than 0.5 per hectare (notably according to Germano *et al.* (2005) no blunt-nosed leopard lizards were observed during 2000 – 2003); and, densities on grazed plots ranged from 0.06 – 0.25 per hectare during 1997 to 2001, and increased to 0.46 – 1.50 per hectare during 2002 to 2005 (Germano *et al.* 2005). Nonetheless, the downlisting criterion has not been met at Lokern.

At Coles Levee Ecosystem Preserve, blunt-nosed leopard lizard surveys have been conducted annually from 1996 to 2004 (Quad Knopf 2005). Only 10 blunt-nosed leopard lizards were observed during the surveys and no blunt-nosed leopard lizards have been observed in the last three years (Quad Knopf 2005). However, incidental observations of blunt-nosed leopard lizards are occasionally made during other monitoring activities (Quad Knopf 2005). Therefore, the downlisting criterion has not been met at Coles Levee Ecosystem Preserve.

At the KWB Conservation Lands, no protocol-level surveys for blunt-nosed leopard lizards have been conducted and the species has not been observed on numerous reconnaissance and meandering surveys over the years. Thus, the population density is most likely well below 2 blunt-nosed leopard lizards per hectare (Jones *in litt.* 2006; Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the KWB Conservation Lands.

Elk Hills Conservation Area
At a site near the Elk Hills Conservation Area, blunt-nosed leopard lizard population density was previously estimated at 0.40 adults per hectare (Kato *et al.* 1987). More recently, blunt-nosed leopard lizard population trends have been monitored in spring and early fall by means of road and foot surveys from 2001 to 2005 in the North Flank and Buena Vista Valley lands of the Elk Hills Conservation Area (Quad Knopf 2006). Population density estimates from 2000 - 2005—

calculated from the average sightings per mile of road survey (with a width of 50 meters)—remained below 0.02 blunt-nosed leopard lizards per hectare in both the North Flank and Buena Vista Valley (J. Jones, Quad Knopf, Inc., pers. comm. 2006). Foot surveys conducted during the same time periods, supported these low observation numbers, and reported 0.01 blunt-nosed leopard lizards per hectare in the North Flank and from 0.01 – 0.07 blunt-nosed leopard lizards per hectare in Buena Vista Valley. Therefore, due to the continually low densities observed in the North Flank and in Buena Vista Valley, the downlisting criterion has not been met at the Elk Hills Conservation Area.

<u>*Delisting Criteria*</u>

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

1) *Three additional areas with about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat including:*
   A) *One on the Valley floor;*
   B) *One along the western Valley edge in Kings or Fresno Counties; and*
   C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.*
2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

<u>Other Valley Floor</u>

The protection of blunt-nosed leopard lizard habitat on the Valley floor in Kern and Tulare Counties and in Merced and Madera Counties is discussed above in the above section on the Downlisting Criteria. None of the protected areas meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor in these areas. Therefore, the delisting criterion has also not been met.

<u>Western Valley edge in Kings or Fresno Counties</u>

Alkali Sink Ecological Reserve

The Alkali Sink ER protects 933 acres of alkali sink scrub and Valley annual grasslands blunt-nosed leopard lizard habitat in northwestern Fresno County (Figure 2). The purpose of the Alkali Sink ER Interim Management Plan (Ashford 1990a) is to preserve the remaining Alkali Sink Scrub habitat type, protect habitat for the Fresno kangaroo rat and blunt-nosed leopard lizard from agricultural conversion. There are no population data available at Alkali Sink ER at this time. The 12,000-acre Mendota Wildlife Area is located immediately to the south of the Alkali Sink ER. However, over two-thirds of the Wildlife Area are seasonally flooded and do not support blunt-nosed leopard lizard habitat. No blunt-nosed leopard lizards have been observed at the Mendota Wildlife Area (S. Juarez, CDFG, pers. comm. 2006). Therefore, the Alkali Sink ER and Mendota

Wildlife Area do not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kerman Ecological Reserve
The Kerman ER is located about 5 miles east of the Mendota Wildlife Area and protects 1,718 acres of Valley Annual Grasslands in northwestern Fresno County (Figure 2). In the Kerman ER Interim Management Plan (Ashford 1990b), protection of Fresno kangaroo rat and blunt-nosed leopard lizard habitat is the principal management focus. Livestock grazing is occasionally permitted to control exotic grasses. Hunting is allowed but vehicles are restricted to roads. There is no population data available for Kerman ER. Therefore, due to its small size, the Kerman ER does not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kreyenhagen Hills Conservation Bank
The 1,295-acre Kreyenhagen Hills Conservation Bank is located in the foothills of southwestern Fresno County. The conservation bank was established by Wildlands, Inc. for providing mitigation credits for impacts to San Joaquin kit fox (*Vulpes macrotis mutica*) habitat in portions of Fresno and Kings Counties. No blunt-nosed leopard lizards have been observed there (Lopez *in litt.* 2006; Warrick *in litt.* 2006); however, the site has numerous washes that could provide suitable habitat for the species (Lopez *in litt.* 2006). There is one reported occurrence of blunt-nosed leopard lizard approximately one mile off-site within the Jacalitos Creek Watershed (CNDDB 2006, Lopez *in litt.* 2006). In summary, due to the small size of the preserve and lack of sightings of blunt-nosed leopard lizard, the Kreyenhagen Hills Conservation Bank does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

Kettleman Hills Area of Critical Environmental Concern
The BLM's Kettleman Hills ACEC consists of 6,730 acres within the Kettleman Hills of western Kings County. The BLM lands, however, are mostly in a checkerboard pattern of 640-acre and smaller parcels. It is not known how much of the ACEC supports blunt-nosed leopard lizard. The Caliente RMP (BLM 1997) covers the ACEC and meets the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. However, due to the highly fragmented nature of the protected lands, the Kettleman Hills ACEC does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

<u>Upper Cuyama Valley</u>
About 1,000 acres of blunt-nosed leopard lizard habitat is protected on the southern edge of the Carrizo Plain National Monument and Ecological Reserve (Saslaw *in litt.* 2006). Most of the rest of the Cuyama Valley, however, is unprotected on private lands and has been degraded by farming activities. There is no population data for blunt-nosed leopard lizard in Cuyama Valley but the populations are likely decreasing there due to an increasing amount of habitat conversion to intensive irrigated agriculture (Stafford *in litt.* 2006). Therefore, due to the lack of population monitoring data and the lack of protection of sufficient habitat, the delisting criteria for the upper Cuyama Valley have not been met.

Appendix B: Habitat Conservation Plans related to the Blunt-Nosed Leopard Lizard and Biological Opinions

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permit included take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs are summarized in Table 4 in the review. Effectively through the HCP process 89,288 acres of habitat land has been conserved, while a total 30,052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary assessment of issued biological opinions from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard. Of these activities, the greatest amount of habitat disturbance authorized were for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB 6,000 acres permanent), and other agricultural, residential, and commercial development activities (MBHCP 15,200 acres permanent).

Details of 11 of the HCPs affecting the blunt-nosed leopard lizard are discussed below.

1. The ARCO Western Energy Coles Levee HCP (currently managed by Aera) authorizes the permanent disturbance of 330 acres of natural lands including 270 acres of blunt-nosed leopard lizard habitat (ARCO Western Energy 1995). Mitigation for the disturbance is the preservation of 990 acres through the 6,059-acre Coles Levee Ecological Reserve conservation bank.

2. The Coalinga Cogeneration HCP (Aera Energy and Chervon 1991) authorizes the permanent disturbance of 49.6 acres and temporary disturbance of 27.6 acres of blunt-nosed leopard lizard habitat in the oilfield near Coalinga in southwestern Fresno County. Mitigation for the project is the protection of 179 acres of blunt-nosed leopard lizard habitat near the site. On June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.

3. The California Department of Corrections Delano Prison HCP (California Department of Corrections 1991) authorizes the permanent disturbance of 287 acres and temporary disturbance of 348 acres of blunt-nosed leopard lizard habitat near Delano in northern Kern County. Mitigation for the project is the enhancement and revegetation of 348 acres of blunt-nosed leopard lizard habitat on-site and the acquisition of 514 acres of blunt-nosed leopard lizard habitat for protection within the Allensworth ER.

4. The California Department of Corrections Statewide Electrified Fence Project HCP authorizes the incidental take of up to 2 blunt-nosed leopard lizards by electrocution at eight

state prisons in a 5-year period during the 50-year duration of the permit (EDAW 1999). Mitigation for impacts to blunt-nosed leopard lizard includes acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and the acquisition and enhancement of an additional 800 acres of low quality laser-leveled farmland at Allensworth ER. However, at this time it is not known whether the restoration of farmland to native habitat will benefit the blunt-nosed leopard lizard. A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003). The major components of the plan include: acquisition of 200 acres of privately-owned land next to the existing reserve boundary; installation of protective fencing and seasonal grazing to reduce non-native annual grass cover (as needed) on the newly acquired land; and patrol and maintenance of fences, monitoring of sensitive population trends, trash removal, and management of grazing leases on the existing reserve lands. As of June 11, 2006, the Wildlife Conservation Board (WCB) had identified two potential parcels for acquisition and was pursuing state-required appraisals prior to escrow. However, due to hesitation on the part of the sellers, CDFG and WCB have identified potential alternative acquisitions to satisfy the mitigation requirement (EDAW 2006).

5. The Chevron Pipeline HCP authorizes the temporary disturbance of 25.5 acres of blunt-nosed leopard lizard habitat in the 27G Pipeline Replacement Project (Chevron Pipeline Company 1995). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 28 acres of blunt-nosed leopard lizard habitat within Chevron's Lokern lands.

6. The Granite Construction Phase I HCP authorizes the permanent disturbance of 54 acres of blunt-nosed leopard lizard habitat for quarrying activities near Coalinga in Fresno County (Granite Construction, Inc. 1993). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 162 acres of blunt-nosed leopard lizard habitat within the Northern Semitropic Ridge ER.

7. The Kern County Waste Facilities HCP authorizes the permanent disturbance of 251 acres of natural lands including 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres of blunt-nosed leopard lizard habitat near Taft in Kern County (Kern County Waste Management Department 1997). Mitigation for impacts to blunt-nosed leopard lizard and other listed species is the protection of 755 acres of habitat at Coles Levee Ecosystem Preserve.

8. The KWB Authority HCP authorized the permanent disturbance of 12,081 acres and temporary disturbance of 291 acres of blunt-nosed leopard lizard habitat in Kern County for up to 75 years. Within the 19,900 acre-KWB, 5,900 acres are for routine recharge activities, 481 acres are for permanent water banking facilities, 960 acres are for plant preserves, 5,592 acres between the water basins will be allowed to revert to habitat, 530 acres are mitigation for the Department of Water Resources projects, 3,170 acres are for farming, and 3,267 acres are for conservation banking for third parties (490 acres of which KWB Authority may use for commercial development). Therefore, 4,263 acres of potential blunt-nosed leopard lizard habitat are protected by the KWB Authority HCP.

9. The Metropolitan Bakersfield HCP (MBHCP) and associated biological opinion (Service 1994) covers an area of 408 square miles around Bakersfield, California. The MBHCP allows the permanent disturbance of 15,200 acres of natural lands but does not estimate how much blunt-nosed leopard lizard habitat would be disturbed. The MBHCP states that mitigation for impacts to natural lands is 3:1 and for impacts to open lands (i.e. agricultural lands) is 1:1. However, the MBHCP does not explicitly state that impacts to a listed species must be mitigated for by the acquisition of lands that support the species. About 1,176 acres of blunt-nosed leopard lizard habitat disturbance has been authorized thus far through the MBHCP (Strait *in litt.* 2006); it is not known at this time how much of the habitat acquired as mitigation through the MBHCP supports blunt-nosed leopard lizard.

10. The Nuevo Torch HCP (currently managed by PXP) authorizes the permanent disturbance of 850 acres of blunt-nosed leopard lizard habitat (Nuevo Energy Company and Torch Operating Company 1999). Thus far, an 840-acre conservation easement in the Lokern area is currently being established as mitigation (R. Garcia, PXP, pers. comm. 2006).

11. The California Aqueduct HCP is currently in draft form. The area covered by the HCP includes seven pumping plants, two maintenance centers, and roughly 121 miles of Aqueduct and ROW within 11,816 acres of Kings and Kern Counties. Impacts from project related activities permitted under the HCP could total up to 1,295 acres—895 acres of impact by DWR, 290 acres of impact by third party water contractors, and an additional 110 acres of impact by other third party activities. Notably, the HCP only provides compensation for impacts by DWR and third party water contractors. Compensation for impacts associated with other third parties entering into a Compliance Agreement under the HCP will be provided via off-site compensation land consistent with Wildlife Agency requirements and subject to their approval prior to the initiation of the impacts. Compensation will be achieved through a combination of two approaches: 1) adaptive management of ROW lands to provide suitable habitat for listed species, and; 2) the conservation of three large blocks of habitat near the Buena Vista Pumping Plant, Teerink Pumping Plant, and Chrisman Pumping Plant. Thus, terms and conditions described within the HCP require DWR to manage 3,474 acres of on-site ROW land to minimize impacts to covered species to the maximum extent practicable. While total compensation acreage provided shall be 817 acres, which can be partitioned into: 242 acres of compensation for past completed emergency consultations; and, 567 acres as compensation for HCP covered activities and impacts

In addition to HCPs, numerous biological opinions have authorized disturbance of blunt-nosed leopard lizard habitat. In some earlier cases no compensation was required. For example, the biological opinion for the Laidlaw Environmental Services, Inc. hazardous waste disposal facility (Service 1988) authorized the permanent disturbance of 320 acres of blunt-nosed leopard lizard habitat in the Lokern area without requiring any compensation. In most cases, however, compensation was set at a ratio of 3:1 for permanent disturbance of natural lands.

In summary, the HCP process has facilitated the conservation of 89,288 acres of habitat land has been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary assessment of issued biological opinions under section 7 of the Act from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

Blunt-Nosed Leopard Lizard (*Gambelia sila*)

Current Classification ______Endangered______

Recommendation resulting from the 5-Year Review

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
__X_ **No change is needed**

Review Conducted By __Sacramento Fish and Wildlife Office Staff_________

FIELD OFFICE APPROVAL FOR REGION 8:

Lead Field Supervisor, Fish and Wildlife Service

Approve ______________________ Date 2·16·10

Lead Field Supervisor, Cooperating Field Office, Fish and Wildlife Service

Concur Diane k. Noda ______________________ Date 2/12/10

22 September 2010

Eric Cherniss, VP Project Development
Solargen Energy, Inc.
20400 Stevens Creek Boulevard, Suite 700
Cupertino, CA 95014

Preliminary Write-up of Golden Eagle Non-Breeding Season Surveys and Raptor Survey

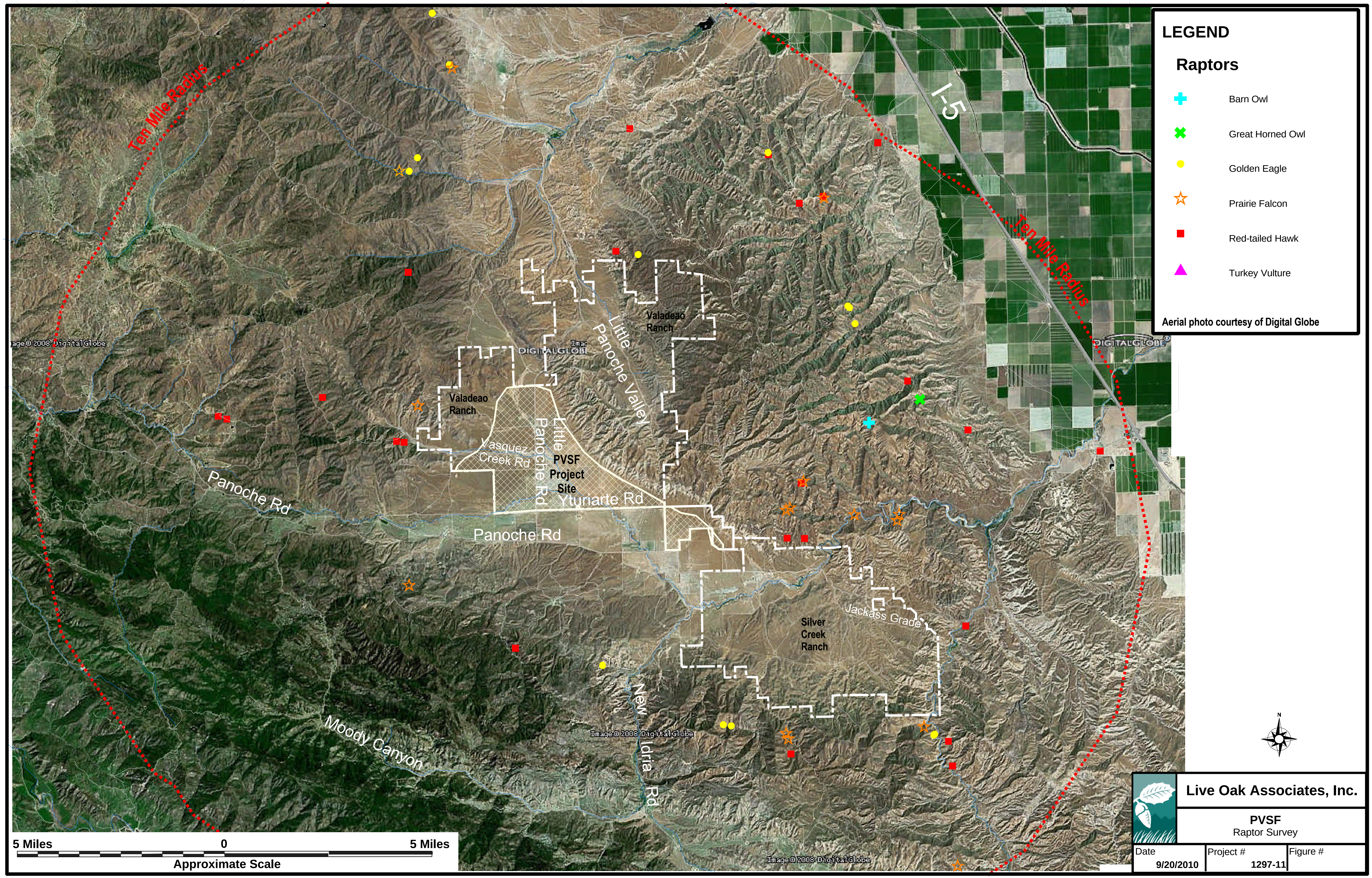
Helicopter-based golden eagle (*Aquila chryseatos*; GOEA) surveys were conducted under the supervision of raptor biologist Pete Bloom and flown for a few days beginning on 5 August 2010 during a non-breeding period. Survey were specifically targeted for GOEA occupancy via individual and nest sightings according to the *U.S. Fish and Wildlife Service Interim Guidelines for Golden Eagle Surveys*. Blue Sky Helicopters of Redlands, CA flew two biologists (Pete Bloom and Scott Thomas) over the site and within a 10-mile radius of the site. During the flight, one biologist observed at all times while the other recorded and marked data when appropriate. Two GPS units, one primary and one backup, were used to document geographic locations of importance and the routes taken; these coordinates were also entered in field notes, and mapped by Live Oak Associates, Inc. (LOA)(Figure 1)

Fifteen GOEA nests were observed within the 10-mile radius of the Project site. Four of those nests showed evidence of having young fledged this year. No GOEA nests occurred within 2 miles of the project boundary.

The raptor species observed are included in Table 1. Photos of observed individuals are available from LOA upon request.

Table 1. Raptor species' nest and/or individuals observed during GOEA flight survey, 2010.

Species	Number of Nests/Individuals
Turkey vulture	1
Red-tailed hawk	24
Golden eagle	15
Prairie falcon	17
Common barn owl	1
Great-horned owl	1



LEGEND
Raptors
Barn Owl
Great Horned Owl
Golden Eagle
Prairie Falcon
Red-tailed Hawk
Turkey Vulture
Aerial photo courtesy of Digital Globe
Ten Mile Radius
Ten Mile Radius
I-5
Valadeao Ranch
Valadeao Ranch
Little Panoche Valley
Little Panoche Rd
Vasquez Creek Rd
PVSF Project Site
Yturiarte Rd
Panoche Rd
Panoche Rd
Jackass Grade
Silver Creek Ranch
New Idria Rd
Moody Canyon
Image © 2008 DigitalGlobe
5 Miles
0
5 Miles
Approximate Scale
Live Oak Associates, Inc.
PVSF
Raptor Survey
Date
9/20/2010
Project #
1297-11
Figure #

LIVE OAK ASSOCIATES, INC.
an Ecological Consulting Firm

DRAFT

SUMMARY OF THE CONSERVATION STRATEGY FOR FEDERALLY AND STATE LISTED SPECIES FOR THE PANOCHE VALLEY SOLAR FARM

April 27, 2010

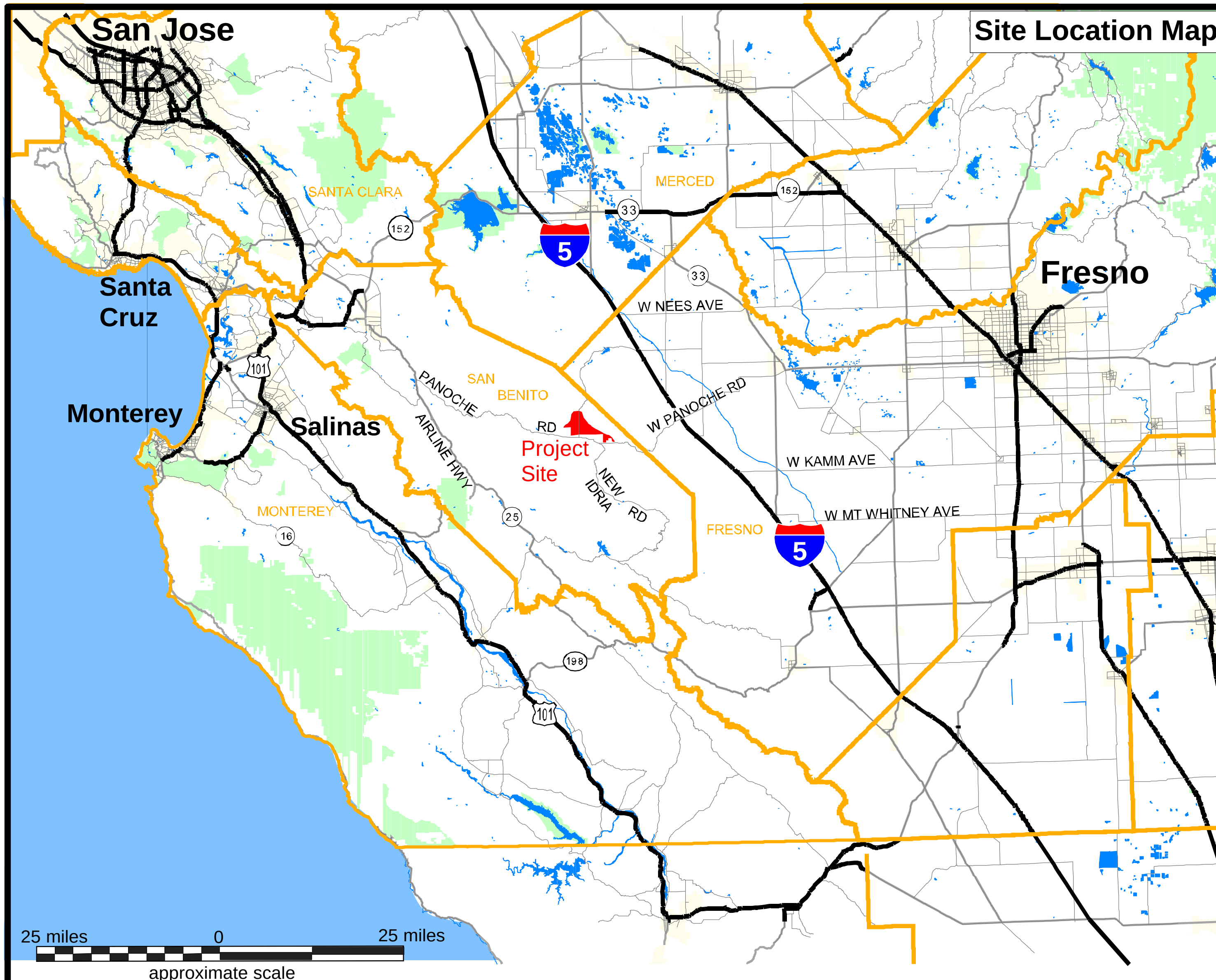
This summary of the conservation strategy proposed by Solargen Energy Inc. for its Panoche Valley Solar Farm (PVSF) outlines measures to avoid, minimize and compensate for take of federal (FESA) and state (CESA) listed species that may be affected by construction and operation of their solar farm (Figure 1). This is not intended to be a comprehensive treatise for the conservation strategy proposed for the PVSF, but provides sufficient detail as to the important components of the plan that have been completed along with on-going analysis and data collection intended to resolve data gaps.

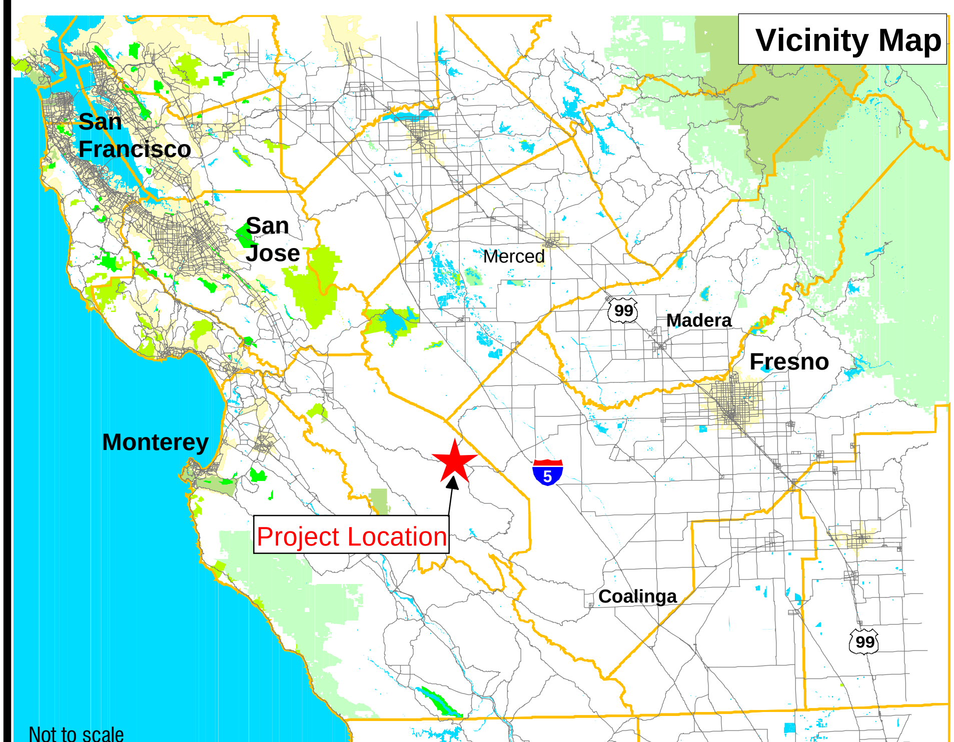
The conservation strategy summarized here, will serve as the foundation for both the Biological Assessment (BA) that is to be submitted to the USFWS for species listed under FESA and the 2081 Application that will be submitted to CDFG for species listed under CESA.

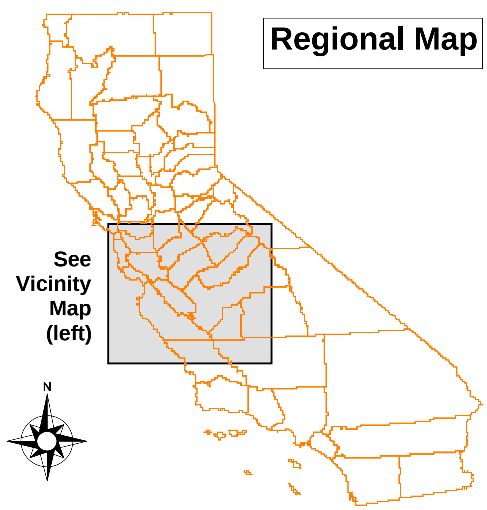
The covered species included in this mitigation plan include the following federal and state listed species:

- Vernal Pool Fairy Shrimp; *Branchinecta lynchi*; Federal threatened
- California Tiger Salamander; *Ambystoma californiense*; Federal and State Threatened
- Blunt-nosed Leopard Lizard; *Gambelia sila*; Federal and State Endangered/California Fully Protected
- Western Burrowing Owl; (*Athene cunicularia*); California Species of Special Concern/Federal Migratory Bird Treaty Act and Fish & Game Code 3501.5
- San Joaquin Antelope Squirrel; *Ammospermophilus nelsoni*; State Threatened
- Giant Kangaroo Rat; *Dipodomys ingens*; Federal and State Endangered
- San Joaquin Kit Fox; *Vulpes macrotis mutica*; Federal Endangered/State Threatened

Two species for which take cannot be authorized by CDFG (blunt-nosed leopard lizard and western burrowing owl) are included in this summary document, for completeness. The USFWS may provide take authorization for impacts to habitat for the blunt-nosed leopard lizard (BNLL), but they may not authorize take of individuals of either the BNLL or the Western burrowing owls (WBO).







Live Oak Associates, Inc.

Panoche Valley Solar Farm
Vicinity Map

Date	Project #	Figure #
4/27/2010	1297-05	1

Both Impacts and associated mitigations for non-listed special status species are being evaluated by the Environmental Impact Report (EIR) that is currently in preparation by the County of San Benito and will not be discussed here.

PROJECT DESCRIPTION

Solargen proposes to construct and operate a 420 megawatt (MW) photovoltaic (PV) solar power plant in Panoche Valley, an unincorporated area of eastern San Benito County. The project would be located on 4,717 acres and would include the following (Figure 2):

Installation of 1,822,800 silicon-based PV panels on framed, the worst case would be the use of 50 Watt panels, and this will give us 8,400,000 panels. The Proposed Nexpower 135 Watt panels will number 3,111,111. Panel count will depend on the panel chosen at the time of construction.

- single-pole steel support structures,
- electrical inverters and transformers,
- an electrical substation,
- an operations and maintenance (O&M) building,
- a septic system and leach field,
- On-site access roads, transmission support towers and line(s) to interconnect with a PG&E transmission line that passes through the project site. Requirements for the switchyard will come from PG&E as they will own a portion of this at the end of the project.
- Solargen is currently in the early stages of negotiations to sell the project's electrical output to PG&E.

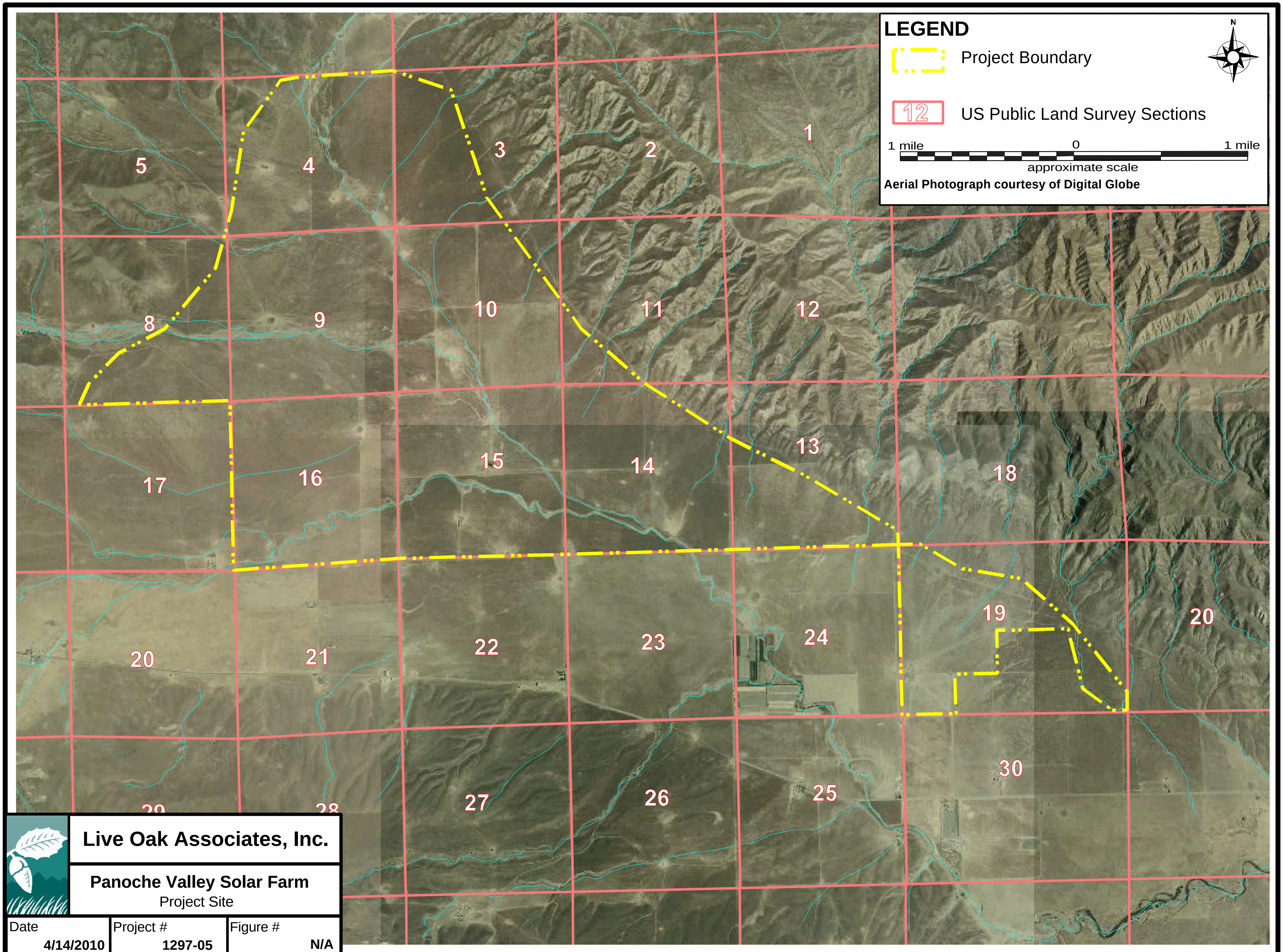
Solargen has applied to the County of San Benito (County) for a Conditional Use Permit (CUP) to allow a solar power plant to be operated on the site. Because of its responsibility for issuing this permit, the County is the lead agency under the California Environmental Quality Act (CEQA) and is responsible for the preparation of this EIR.

The proposed solar farm site comprises approximately 4,717 acres, is irregularly-shaped, and consists of all or parts of the following (Figure 2):

- Sections 3, 4, 8-11, and 13-16 of township 15 south, range 10 east; and
- Section 19 of township 15 south, range 11 east.

Lands adjacent to the proposed solar farm site are being proposed as mitigation for anticipated impacts to sensitive plant and wildlife impacts (Figure 3). These proposed mitigation lands consist of all or parts of the following:

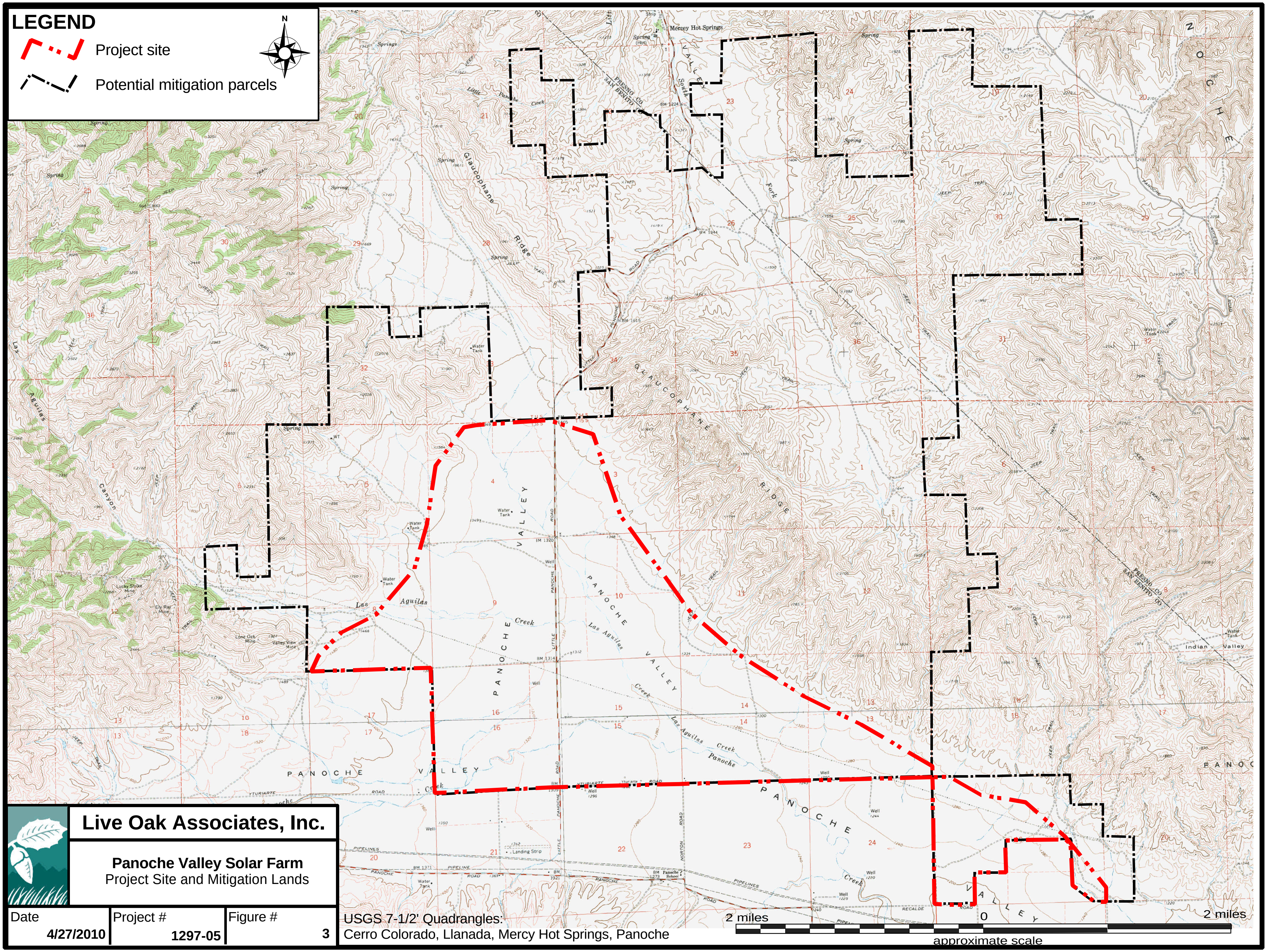
- Sections 19, 30, and 31 of township 14 south, range 11 east;
- Section 21-27 and 32-36 of township 14 south, range 10 east;



Live Oak Associates, Inc.

Panoche Valley Solar Farm
Project Site

Date	Project #	Figure #
4/14/2010	1297-05	N/A



LEGEND
N
Project site
Potential mitigation parcels
Live Oak Associates, Inc.
Panoche Valley Solar Farm
Project Site and Mitigation Lands
Date
4/27/2010
Project #
1297-05
Figure #
3
USGS 7-1/2' Quadrangles:
Cerro Colorado, Llanada, Mercy Hot Springs, Panoche
2 miles
0
2 miles
approximate scale
Mercey Hot Springs
Glaucophane Ridge
GLAUCOPHANE RIDGE
PANOCHE VALLEY
Las Aguilas
Las Aguilas Creek
Panoche Creek
Indian Valley

- Sections 1-8 and 11-14 of township 15 south, range 10 east; and
- Sections 6, 7, 19, and 20 of township 15 south, range 11 east.

The proposed solar farm site and a majority of the mitigation lands are all located in the eastern region of San Benito County, California, in an area known as the Panoche Valley. The northeastern extent of the proposed mitigation lands is located in western Fresno County and includes parts of Little Panoche Valley and Glaucophane Ridge.

The majority of parcels within the solar farm site are used for cattle grazing; the remaining lands are homesteads, patches of row crops, grape production and an old dairy. The site is surrounded by rangeland and bordered to the west by the Gabilan Range and to the east by the Panoche Hills. A number of drainages and creeks are present in the area including the aforementioned Panoche and Las Aguilas Creeks. The portion of the Valley associated with the proposed project ranges in elevation from approximately 1240 feet National Geodetic Vertical Datum (NGVD) to approximately 1400 NGVD.

ANTICIPATED LEVEL OF TAKE

There is a paucity of data on how PV solar arrays will affect the continued use of the site by the various species, particularly state or federally listed species. Many of these species (BNLL, GKR, SJAS) exhibit life history strategies that would be best classified as r-selected species, with high reproductive capacity that more closely tracks changes in resource production than species with lower reproductive rates that usually exhibit longer lag time in a functional and/or numerical response. In fact, populations of these species that occur on site are known to fluctuate substantially with rainfall patterns – wetter years tend to produce higher food resources, higher reproductive rates, and increasing populations. Poorer rainfall years, particularly several in a row can lead to depressed populations.

The proposed project would be installed over an area of approximately 4,717 acres (7.4 square miles). However, the proposed design confines the solar arrays, substation, and facility buildings to a footprint of 2,201.5 acres, on-site access roads would occupy approximately 30 acres, and buried electrical collection conduit would occupy 37.4 acres. The remaining 1,680 acres (35% of the site) within the project boundary would be left undisturbed and unshaded. Undisturbed areas would include on-site drainages and riparian buffer zones.

The entire site is currently grazed with no consideration to maintaining the suitability of the site for the target species. These species persist in spite of the current grazing regime, which is driven almost exclusively on economic objectives. Observational data for these species indicate that they generally prefer short grass conditions, with very limited experimental evidence supporting a specific grazing regime.

The project has integrated a number of design features to avoid impacts when possible by avoiding wash and stream habitats - barren areas that may support BNLL or other burrowing species by setting back from the habitat features by minimum of 100 ft from the top of bank.

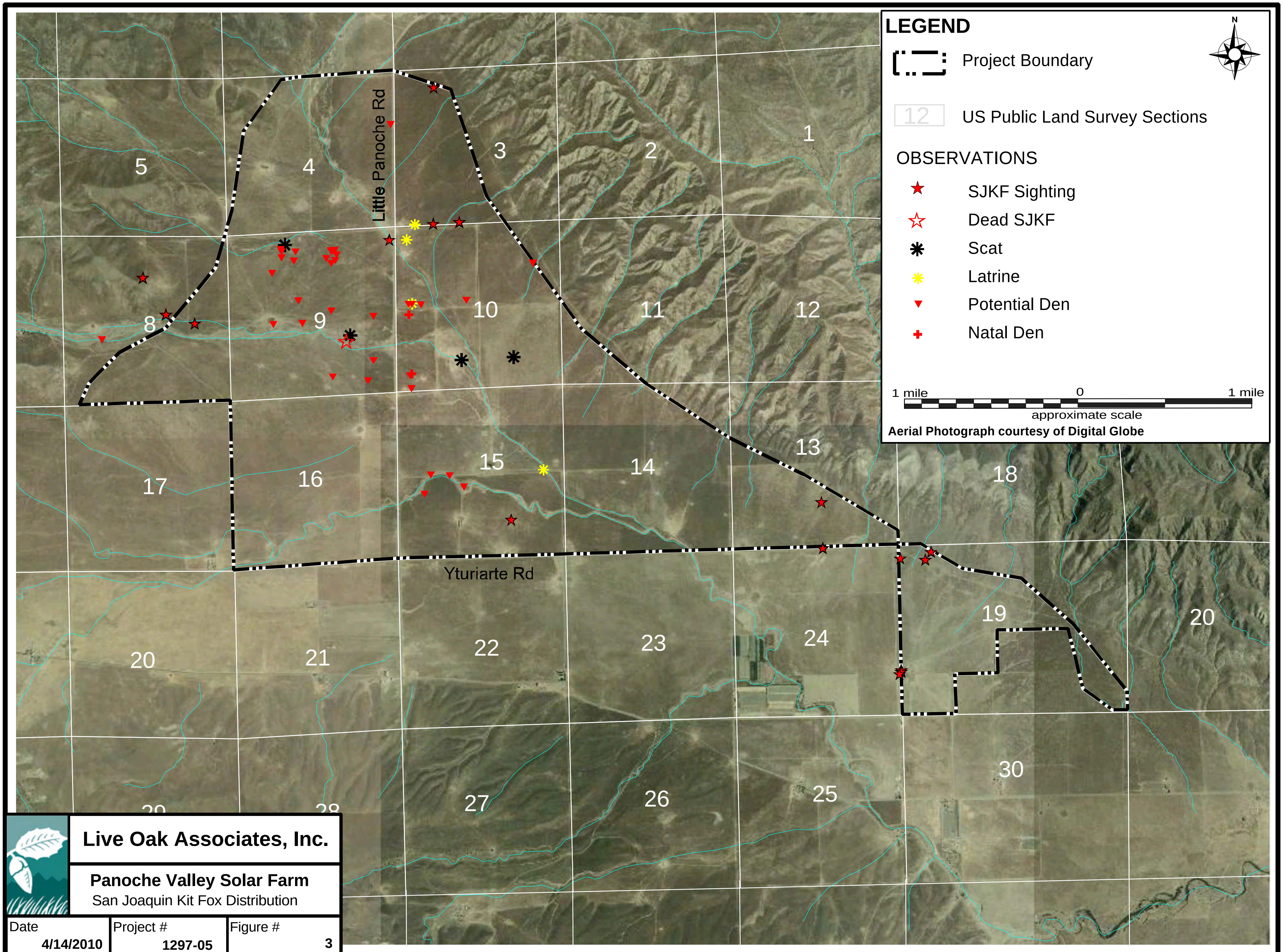
Approximately 12% (603 acres) of the site will be shaded by solar arrays while approximately 35% (1680 acres) of the site will remain undisturbed and unshaded by solar arrays. Little is know how listed species known to occur on site will react to the placement of a solar farm on the landscape. The solar arrays, roads, supporting facilities are expected to have some adverse affect on these species continued use of the site as shading may alter the micro-climate under the arrays, and undisturbed habitats (35% of the site) will be fragmented. However, construction and operation of the solar farm is intended to avoid and minimize impacts to existing resources to the maximum extent practicable and on-going management of the grasslands that will remain on site are intended to be specifically managed to maximize food productions for such species as GKR and other small burrowing animals. Therefore, while some degradation is expected, it is unreasonable to assume that the site will completely lack suitable habitat attributes for these species to persist at some lower level. These same set of species are known to occur at modest levels within any number of oil fields of varying development density in Kern County – habitats that are also fragmented by oil wells, pipelines and roads. Admittedly, the percent of the landscaped converted to developed uses in oil fields is usually less, but the fact that the facilities fragment the landscape is undeniable, yet many of these species persist in modest to high numbers as long as suitable habitat attributes exists and food resources remain relatively modest or high.

WBO for instance are known to occur in high densities in human altered landscapes. For example, the WBO in the agricultural areas of Imperial County where as much as 70% of the states population presently occurs, is estimated to approach a density 50 times higher than the desert communities would support naturally. WBO actively use agricultural roads and levees in the San Joaquin Valley and occur regularly in grassland habitats adjacent to dense development in the Bay Area Counties. Nonetheless, at buildout, WBO are expected to continue to use the site, but likely to a lesser degree.

The SJKF has been detected on site on number of occasions during biological surveys conducted for this project (Figure 4). This site supports suitable landscape attributes to provide foraging, breeding and movement habitat for the species within a regional context. The recovery plan for upland species of the San Joaquin Valley recognizes the Ciervo-Panoche Natural Area as one of the three remaining core populations for kit fox. While not its preferred habitat, this species is known to use fragmented habitats associated with on-going and developing oil fields in Western Kern County. For example, more than twenty-five years (1979 to 2004) of data were collected at the Naval Petroleum Reservoir (NPR1 and NPR2) that has been in oil production since the early 1900's with oil production increasing markedly since the mid-1990's. SJKF have continued to be detected throughout the oil fields during the last decade, including the rather varied and steep topography associated with NPR1.

A well known population of kit foxes is associated with the urban environments of the City of Bakersfield – again, not a preferred circumstance, but evidence that the species response can accommodate human dominated landscapes.

Mammalian carnivores are intelligent and idiosyncratic. While individual kit foxes in the Panoche Valley region have had to contend with some limited traffic, farm houses, pets and other aspects of human existence in a rural environment, they have not had to accommodate



Live Oak Associates, Inc.

Panoche Valley Solar Farm
San Joaquin Kit Fox Distribution

Date	Project #	Figure #
4/14/2010	1297-05	3

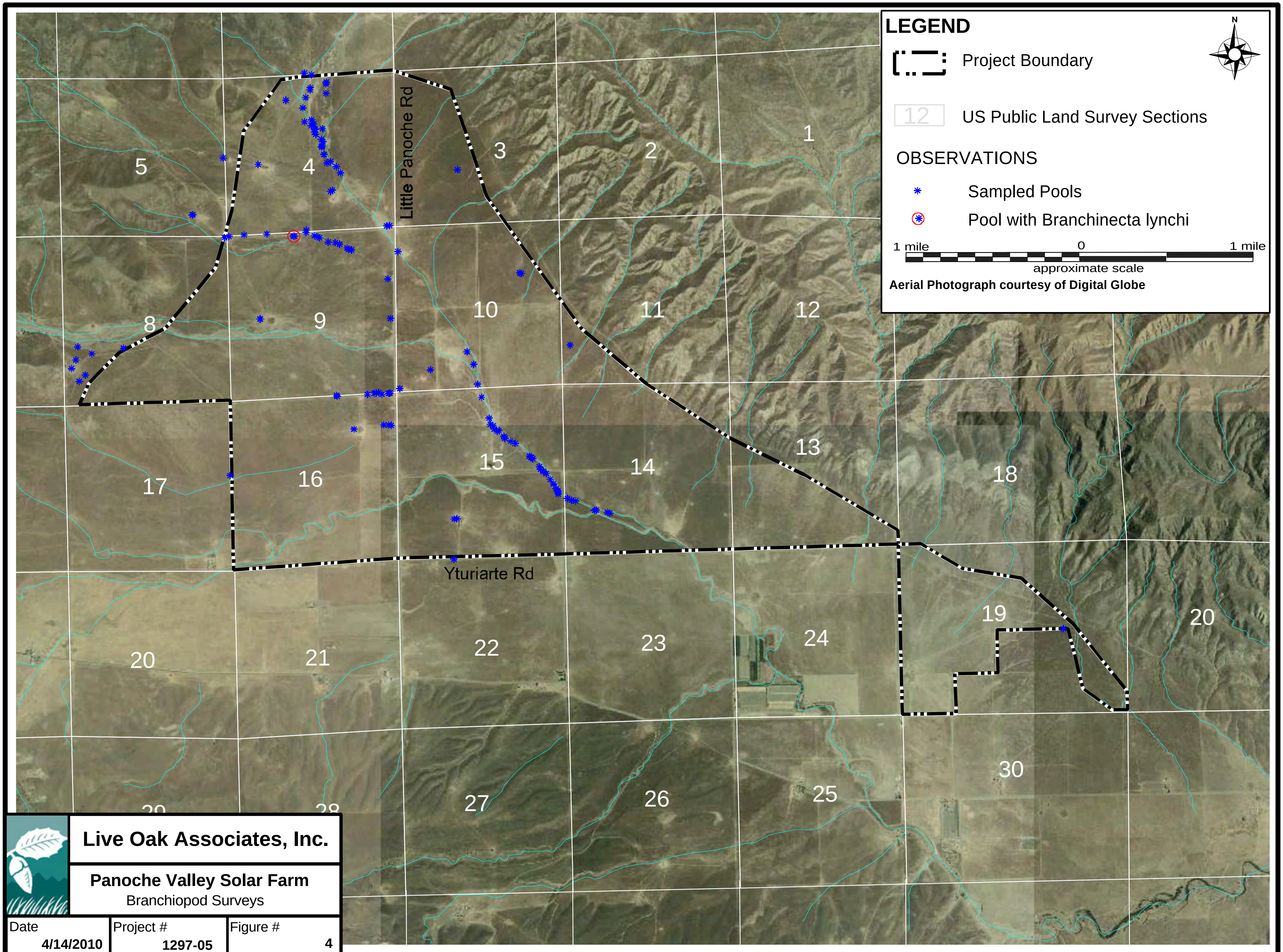
large landscape scale changes, such as a solar farm. Given that the site will be managed largely through grazing to maximize the occurrence of small mammals – important prey for kit fox, we would expect that kit foxes will take advantage of the availability and distribution of any remaining GKR burrow clusters. The site will be managed to also promote egress and ingress of wildlife species, particularly kit foxes. As foxes are known to den in landscape medians at shopping malls in Bakersfield, we would expect that foxes would continue to use the site also for breeding. As noted for GKR, we do expect the overall value for kit foxes to be less than it was prior to the construction and operation of the solar farm.

A total of 126 pools were sampled for listed brachiopods and CTS. California tiger salamander (CTS) larvae were only detected in one pool just off the western boundary while the listed vernal pool fairy shrimp was detected also in only one pool (Figures 5 and 6). In general these pools are rather devoid of aquatic life and in fact during a one-month period of time the CTS larvae had shown no marked growth – indicating poor forage production. Larval surveys are on-going and will be completed in May 2010. The first wet season surveys for brachiopod have been completed with follow up dry season surveys planned to be completed during the summer of 2010.

The pool that supports CTS just to the west of the project will remain intact, but solar arrays will be placed in areas to the east of this pond that could support upland habitat for this species. If 2010 larval surveys confirm this as the only breeding locale on site, than solar arrays in the upland habitats to the east of this pond would affect roughly half of the upland habitat associated with this pond. Unlike many development projects that certainly convert the upland habitat east of the pond to developed uses rendering it useless for estivating salamanders, solar farm should retain some residual value, particular if it is managed for small mammals, the burrows of which are critical for CTS.

The San Joaquin antelope squirrel (presently three sighting) appears quite limited and restricted on site. On-going surveys for these three species will provide additional information as to this species rarity on site.

The level of take of habitat cannot be presently estimated BNLL. The level of take for vernal pool fairy shrimp (VPFS) and the San Joaquin antelope squirrel (SJAS) is expected to be rather limited to a small portion of the site. Three species are more common on site and the modifications of the landscape by the solar farm is expected to have a more pronounced affect on these species: WBO, GKR and SJKF. The CTS is also limited in its extent on site, but the amount of habitat affected by the project could range upward of 175 acres (assuming the majority of the population estivates within 2200 ft of the pond). Therefore, for the purpose of this analysis, given the level of proposed landscaped changes, we suggest that the site will degraded by about 60% for these four species. In other words, a 40% residual value will remain for the CTS, WBO, GKR and the SJKF.

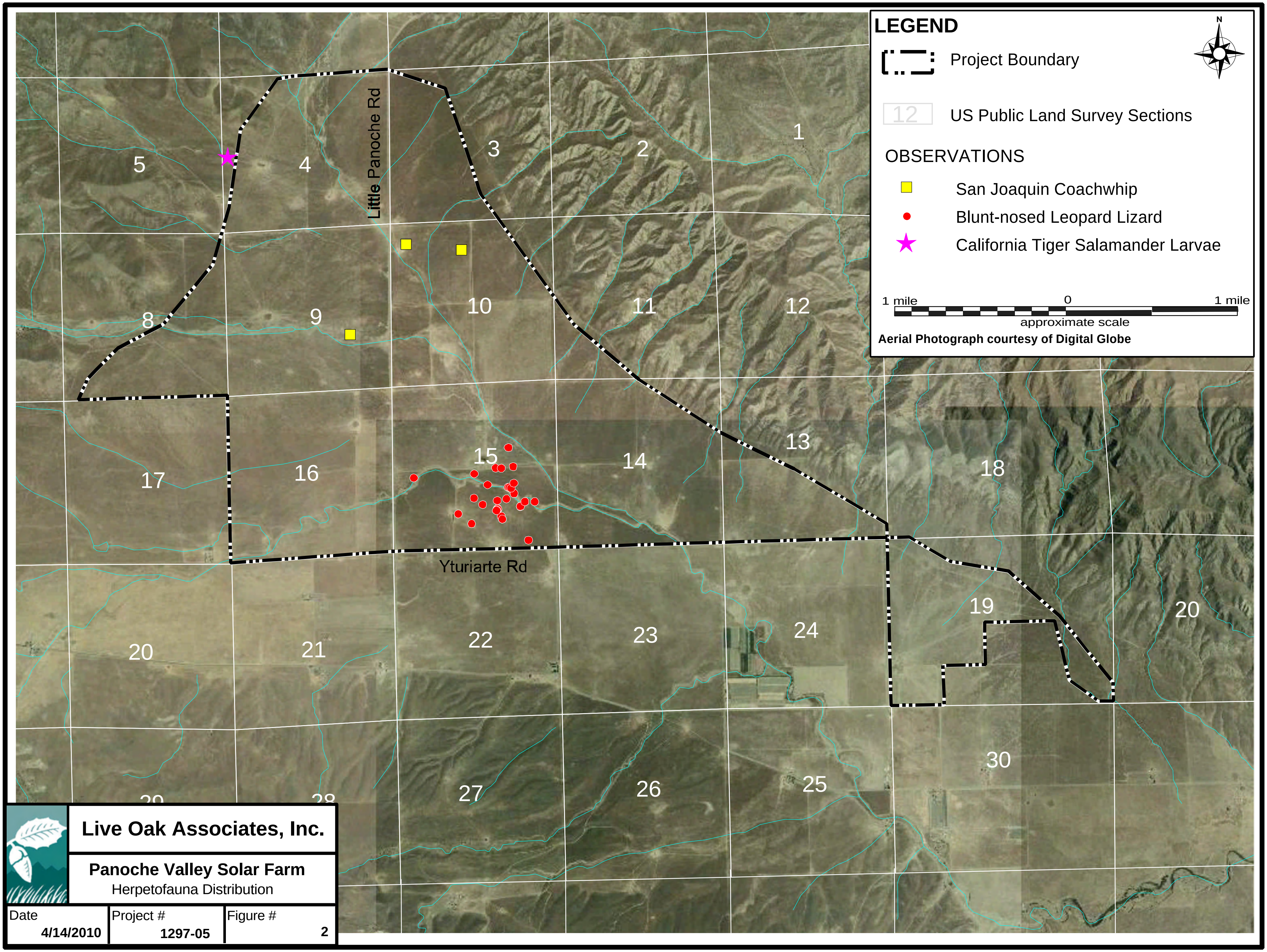


Live Oak Associates, Inc.

Panoche Valley Solar Farm

Branchiopod Surveys

Date	Project #	Figure #
4/14/2010	1297-05	4


LEGEND
N
Project Boundary
12
US Public Land Survey Sections
OBSERVATIONS
San Joaquin Coachwhip
Blunt-nosed Leopard Lizard
California Tiger Salamander Larvae
1 mile
0
1 mile
approximate scale
Aerial Photograph courtesy of Digital Globe
Little Panoche Rd
Yturiarte Rd
5
4
3
2
1
8
9
10
11
12
17
16
15
14
13
18
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25
30
Live Oak Associates, Inc.
Panoche Valley Solar Farm
Herpetofauna Distribution
Date
4/14/2010
Project #
1297-05
Figure #
2

Species for Which Take of Individuals Will Not Occur

The project will not result in take of BNLL or WBO.

Blunt-nosed Leopard Lizard
Solargen has developed a three-step process which the Panoche Valley Solar Farm (PVSF) will implement to ensure that the construction and operation of the project fully complies with the Fish and Game Code obligation to avoid take of the fully protected blunt-nosed leopard lizard (BNLL).1

Step One – Avoidance Through Project Design: The occurrence of blunt-nosed leopard lizards (BNLL) in wide, sandy bottomed washes in low relief terrain has been well documented; as a result, all such washes observed during all surveys (protocol and quantitative sampling efforts) are considered to represent potential blunt-nosed leopard lizard habitat and should not be disturbed to the maximum extent practicable. Therefore, Solargen has provided in their design of the photovoltaic facility on the Panoche Valley Solar Farm (PVSF) a buffer of no less than 100 feet from all streams and washes crossing the project site. The buffer will be measured from the top-of-bank for each side of the features. Thus, no disturbance will occur within these habitats, or within 100' from the edge of these habitats, except for a few unavoidable road crossings (which will be designed to minimize their impact as described below). As a result, the most likely locations for BNLL occurrence on the project site will be avoided.

Step Two – Avoidance in Construction Areas Through Additional Protocol Surveys: For road crossings through washes that are unavoidable, protocol BNLL surveys (extent of which will be pre-approved by CDFG) will be completed for the limited areas where bridges will be constructed If BNLL are detected during these surveys, then they will be avoided with a 50 ft. buffer and exclusion fencing erected to keep them out of the work area where the bridge is being constructed. Even in the advent of negative survey results, as a matter of precaution, a 30-ft buffer from small mammal burrows in washes will be recognized during construction of bridges over washes. The standard recommendation prohibits vehicles traversing washes except in defined work zones.

For construction of the solar panel arrays, protocol BNLL surveys during the adult season (April 15 to July 15) will precede ground disturbance regardless of type of habitat. This recognizes that construction can occur any time after the completion of these surveys, but prior to the next adult season (see pre-construction and construction monitoring below). Avoidance recommendations and buffers as shown below will be adhered to (Table 1). If BNLL are detected in non-wash habitats during the protocol surveys conducted prior to each phase (or during any sort of survey for that matter), than the project will redesign their solar arrays to accommodate this detection by placing a 5 acre buffer (approximately a 265 ft radius) over the observation in such as to capture areas of high burrow density. Five acres is roughly equivalent to the average female home range as reported by Warrick et al. (1998). In other words, the buffer will not be a simple circle with a 265 ft radius, but a polygon that captures the best available habitat for this detection; with a caveat that no component of the project will occur within 50 ft of this sighting

1 Compensation for loss of habitat for BNLL associated with this project will be permitted by the U.S. Fish and Wildlife Service (USFWS) via the Section 7 process and will not be discussed in this document.

Step Three – Avoidance in Construction Areas Through Pre-Construction Surveys and Construction Monitoring: All construction activities must be preceded, by not more than 30 days, by a pre-construction survey for BNLL. If a BNLL is observed within a construction area, that location will conform to the 5-acre buffer as described above. This buffer will immediately be marked by construction fencing or flagging, and will be avoided until it is determined that the BNLL has moved out of the construction zone.

Table 1. Avoidance and Minimization Measures for the BNLL on the PVSF project.

Avoidance and Minimization Measures	**Description**
Avoidance of washes and streams	Washes and streams should be avoided by the project including a 50-ft buffer as measured from the top-of-bank on both sides of these features.
Avoidance Zones for bridge construction – protocol surveys	Protocol surveys will be conducted during the April 15 to July 15 adult BNLL season prior to any disturbance associated with constructing the limited number of bridges necessary for the project. Therefore, in these few cases where complete avoidance of washes and streams are not feasible the project will establish 30-ft buffers from small mammal burrows (whether BNLL are detected at them or not) in wash bottoms and 50-ft buffers from any observed BNLL location in these features. These buffer zones will be demarcated by construction fencing to ensure that construction crews do not enter the avoidance zone. Monitors will be present during construction activities.
Avoidance for non-wash habitats – protocol surveys	Protocol surveys will be conducted during the adult season period of April 15 to July 15 prior to any surface disturbance. Project elements will avoid all observations of BNLL based on a 5-acre buffer that will be encompass the sighting and include the best available habitat within this 5-acres; the closest edge of the buffer to the sighting will be 50ft.
Avoidance through pre-construction surveys and construction monitoring	All construction activity including all vehicular traffic should be contained within the defined construction zone. The construction zone will be demarcated with exclusion fencing to ensure that a BNLL does not errantly wander into the construction zone. An on-site monitor will be present during all construction activity in this area. In addition, pre-construction surveys will be conducted no more than 30 days prior

	to any surface disturbance and on-site monitor will be present during all construction activities to ensure that the project does not harm or injure individual BNLL. If a BNLL is detected during construction by the on-site monitor, than the 5-acre buffer as described above will be established around this location and the project will avoid constructing any project elements within this buffer. The project will also implement all BMPs as discussed below.

In addition the avoidance measures discussed above, Solargen will also conduct a series of protocol surveys, quantitative sampling, preconstruction surveys and construction monitoring to further ensure that the project is built and operated in such a way as to remain in compliance with the Fish and Game Code.

Phase I – Section 16 (2010 Surveys)

The construction of Phase I of the project is now expected to occur on Section 16 (640 acres). Phase I will consist of approximately 200 acres of photovoltaic solar panels, and associated infrastructure. Full protocol-level adult BNLL surveys will be conducted on all of Section 16 between 15 April and 15 July 2010 (12 full surveys will be completed for adults whether BNLL are observed or not). Protocol-level juvenile BNLL surveys (5 full surveys) will be conducted on all of Section 16 between 1 August and 15 September 15 2010 if adult surveys are negative for BNLL presence. All surveys conducted will precisely follow the conditions detailed in CDFG's May 2004 *Approved Survey Methodology for the Blunt-nosed Leopard Lizard*. Appropriate buffers, and the pre-construction surveys and construction monitoring measures described below, will be employed to ensure that no take of BNLL occurs. The quantitative sampling efforts described below and beginning the spring of 2010 will also inform the precise design of Phase I.

Quantitative Sampling (2010)

Based on the site-specific information generated from the 2009 protocol surveys, Live Oak Associates, Inc. developed a quantitative sampling methodology to be employed on the entire 4,717-acre project site in 2010. One purpose of this approach is to inform project design by identifying areas of likely BNLL presence (which areas the project would avoid and preserve) and absence (which areas would be the focus of project construction); as described below, this information would later be supplemented by focused surveys and construction monitoring on a phase-by-phase basis to ensure take avoidance. The sampling methodology will also produce robust BNLL information for the entire project site for purposes of analyzing biological resource impacts in the EIR. This sampling methodology consists of the following:

- Quantitative sampling proposed (i.e., occupancy modeling framework – change over time metrics) over the entire project site for BNLL and other targeted species (e.g., BUOW, SJAS, GKR, SJKF, etc.). 90-random and 45-targeted sampling points distributed across the 4,717-acre project site. Sampling points will be no closer than 280m to ensure independence of the sampling unit and each sampling point will be buffered by a 2 ha (5-

acre) area that will be intensely surveyed consistent with established agency protocol for adult BNLL between 15 April and 15 July 2010. Each sampling unit will be visited 5 times during this 3-month window which allows estimates of important parameters of detection probability, occupancy, colonization and extinction over a multi-season (multi-year) basis. Sampling effort can either be increased spatially or temporally. It is common within an occupancy framework to maximize effort temporally for the expressed purpose of developing detection histories. We have chosen 5 surveys conducted during the adult survey window based on Germano (2009), which states the average time to detect BNLL is 2.27 days (n=48 10-day efforts). The average time to detect the species decreases to 1.18 days when the species is abundant and increases to 3.60 days when the species is sparse.

Full Coverage Surveys for future Phases

For all future phases of project construction, initial project design will be informed by the 2010 sampling methodology and subsequent years of sampling. This will be supplemented phase-by-phase by full protocol-level surveys (12 surveys) for BNLL adults, to be performed between the 15 April and 15 July survey period preceding construction of that phase. As noted above, if no BNLL are detected during the adult survey window, then full coverage surveys will be conducted during the juvenile period (five full coverage surveys conducted between 1 August and 15 September). However, if BNLL are detected during the adult season, then no surveys will be conducted during the juvenile season. Appropriate buffers will be employed to ensure that no take of BNLL occurs.

Pre-construction and Construction Monitoring

As described above, each phase of project construction will be preceded by both (1) the sampling methodology survey, and (2) focused protocol-level surveys for adult BNLL during the optimal survey period of 15 April to 15 July. In addition, Solargen will employ extensive pre-construction and construction monitoring in each construction phase to further ensure that take does not occur. A qualified biologist will (1) conduct one full-coverage pre-construction survey within 30 days prior to the onset of construction, (2) conduct an additional pre-construction survey immediately prior to the onset of construction, and (3) conduct ongoing monitoring of construction activities in any areas that could potentially be occupied by BNLL.

Operation

The project will be operating in such a way as to not harm or injure a BNLL during the life of the project. Standard procedures will be employed as are done for other projects in BNLL range (e.g., oil fields) and will include (but not be limited to), staff training, pre-established speed limits, etc.

The project while designed to not take individuals may result in the loss of some undermined amount of habitat for this species. Those studies discussed above will provide a more precise estimate as to the amount of habitat likely affected by this project.

The current project design is expected to avoid wash and creek habitats in such a manner as these areas are expected to continue to operate at some level for the species. It will not be possible to evaluate the overall affect of the project on the loss of BNLL habitat until such time as the 2010 surveys are complete.

WBO

The WBO is widely distributed in the state with approximately 70% of its population for the state occurring in Riverside and Imperial County. The southern and central San Joaquin Valley is estimated to support approximately 15% of it population. This site may support wintering and breeding habitat for a number of pairs of owls (surveys in 2010 are expected to provide a better measure of their distribution and abundance on the site). While this site may be important for this species, the loss or degradation of the entire project site for this species is not expected to result in jeopardy, given the measures employed to ensure no take of WBO, particularly breeding birds, and given the relative abundance and distribution of this species in the region, off of the project site.

Species for Which Sufficient Data Exist to Estimate Take of Individuals and/or Habitat

As previously discussed, based on current information the project will result in limited loss of habitat for three species: VPFS, CTS and SJAS. As noted above, while only one breeding pond has been identified for CTS, up to 175 acres of upland habitat could be affected (but not eliminated) by this project. For the purpose of this summary, these species will not be considered further. The comprehensive mitigation plan discussed in detail in the BA and 2081 Application will provide suitable details for the relevant species. These documents will address all federal and state listed species to ensure that appropriate avoidance, minimization and compensation measures and employed for each of these species. In addition, the adequacy of the mitigation plan to compensate for loss of habitat for BNLL is not presently known as these surveys are just now getting underway.

Specific Data Analysis Associated with Distance Sampling for GKR and San Joaquin Kit Fox

The methodologies described below and in Appendix A provide good estimates as to the level of take and the adequacy of the mitigation lands to compensate for this impact. For the purpose of this analysis we conducted line transect surveys using distance sampling (Buckland *et al*. 2001) in 63.6 sq km Panoche Valley study area in late February and March 2010. These sampling surveys occurred on both the 4717 acres Project Site and the 11,000acres Mitigation site. North-south transects were walked that were placed at approximately 350 m intervals in the study area (Figure 3). For the analysis, the study area was considered in its entirety and into areas of interest for this effort: the Mitigation Lands (44.5 sq km), the Project Area (19.1 sq km) and, for two transects that spanned both Lands, a combined site Mitigation/Project Area (63.6 sq km).

The locations of target resources and, in some cases, estimated densities were recorded. The methods for burrow cluster data collection were modeled after Townsend 2006 and Townsend & Zahler 2006 for density estimates of burrow cluster and potential San Joaquin kit fox den.

The targets include the following:

Primary Targets

1. Potential kangaroo rat burrows complexes (based on time and shape, other sign)
2. Giant kangaroo rat and giant kangaroo rat burrow complexes

3. San Joaquin Kit Fox and potential San Joaquin kit fox dens (4.5 inches in diameter or greater, other sign)
4. Blunt nosed leopard lizards and habitat
1. San Joaquin antelope squirrel and habitat
2. Badger and badger den (distinct half moon shape – much wider than tall, other sign)
3. burrowing owl and burrowing owl burrows (burrow with white wash or pellets, burrowing owl feathers)

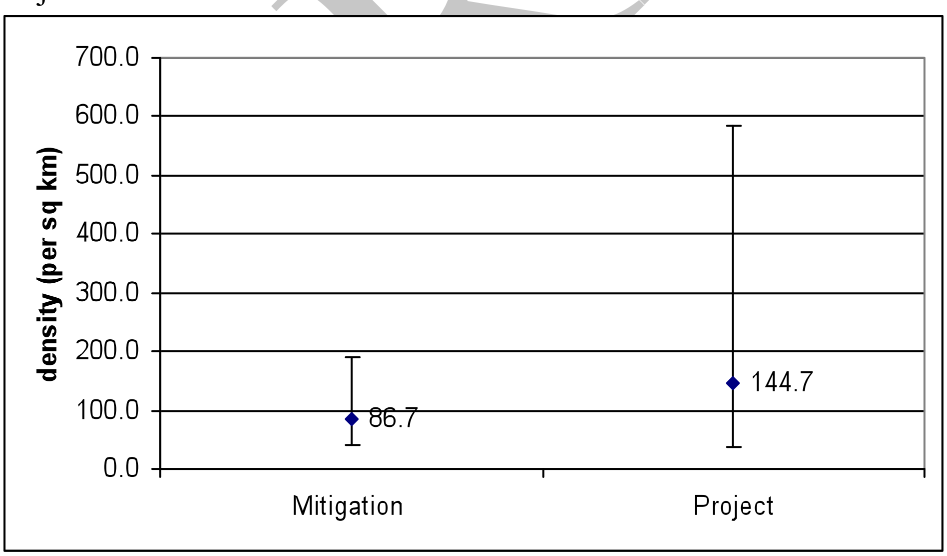
Secondary Targets

3. Carnivore Scat
4. Raptors – eagles, hawks, falcons, owls
5. Loggerhead Shrikes
6. Mountain Plovers
7. Local carnivores: coyotes, bobcat, cougar, red fox

See Appendix A. for details related to the Methodology and Results. Only relevant information well be summarized in this section.

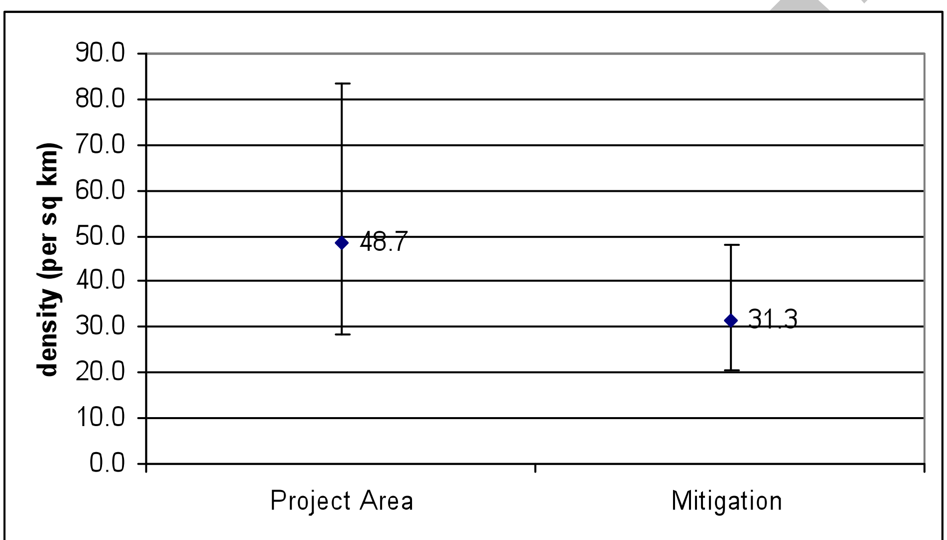
The density of burrow clusters for GKR were higher on the project site than mitigation site, however, the Project Site had much wider confidence intervals due largely to a smaller sample size. Additional data are currently being analyzed and early indications suggest that while there are fewer burrow clusters per km^2 on the mitigation site for GKR, the size of the burrow clusters are much larger on the mitigation lands likely yielding larger populations of GKR for the mitigation site when compared with the Project Site. Those data analysis will be available by the end of April.

Figure 7: Giant kangaroo rat density estimates (with upper and lower CI) for the Mitigation and Project Areas.



The density estimates for San Joaquin kit fox dens, badger dens, other carnivore dens and burrowing owl burrows was higher on the Project Site than on the mitigation lands (Figure 8).

Figure 8: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI for the Mitigation and the Project Area.



MITIGATION LAND

Biological Goals and Objectives

The biological goals are broad, guiding principles for the conservation program for this project and provide a rationale for the minimization and mitigation strategies. Biological objectives provide direction in management in order to achieve biological goals. These biological goals and objectives are specifically tailored to address the impacts and duration of the permitted activities. The goals and objectives guide the development of an adequate and effective conservation program.

Goal 1
Maintain viable, self-sustaining populations of the Covered Species within the Project Site and associated mitigation lands

Objective: Implement avoidance and minimization measures to minimize impacts of Covered Activities on the Covered Species within the PVSF.

Objective: Identify important movement areas (corridors) for key species and prioritize those lands for acquisition for conservation purposes.
Objective: Establish, enhance and manage permanent conservation areas to benefit the Covered Species.
Objective: Implement a monitoring program that provides sufficient information to determine relative fluctuations in Covered Species numbers in the PVSF and associated conservation lands and provides a feedback loop for adaptive management.

Goal 2

Establish at PVSF and on surrounding lands a Covered Species preserve system that complements and provides important linkages to other conservation lands, lands supporting covered species and conservation efforts in the region

Objective: Contribute monitoring data about the presence and relative abundance of Covered Species on the PVSF and associated conservation lands for use in regional conservation planning.

Goal 3

Minimize and avoid loss of individual Covered Species and their habitats during construction and operation of PVSF

Objective: Avoid and minimize impacts to Covered Species through the implementation of preconstruction surveys, best management practices, and an employee education program

Goal 4

Fully mitigate impacts to CESA-listed Covered Species by improving the existing conservation value of mitigation lands for Covered Species

Objective: Eliminate unauthorized off-road vehicle and pedestrian trespassing on mitigation lands through fencing and security patrols

Objective: Conduct appropriate site-specific habitat restoration and enhancement activities

Goal 5

Establish a conservation program for the PVSF and mitigation lands that are consistent with published recovery plans

Objective: Establish conserved lands in perpetuity in order to benefit Covered Species.

Goal 6

Have no take of the blunt-nosed leopard lizard so long as the species remains a "fully protected" species under California law and no take of burrowing owl under the MBTA and Fish and Game Code Section 3503.5.

Objective: Strictly enforce BNLL-specific pre-construction survey protocols and resulting recommendations, and implement BNLL-specific best management practices, to ensure take of BNLL does not occur.

Objective: Enforce all relevant conservation measures to ensure no take of individual or nesting burrowing owl occurs.

Goal 7
Do not exceed annual take limits of Covered Species

Objective: Use annual reporting to inform USFWS/CDFG about take of Covered Species
Objective: Maintain database to track annual take.

Goal 8
Implement an effective adaptive management program

Objective: Use the on-going monitoring for the project site and mitigation lands to adjust management and avoidance and minimization strategies in order to promote Covered Species' viability.
Objective: Collect data systematically on Covered Species on an annual basis and manage data for accessibility.
Objective: Maintain a central database that uses geographical information system for spatial analysis and presentation of Covered Species locations.
Objective: Use unbiased sampling techniques to collect scientifically credible information about Covered Species abundance and distribution.
Objective: Implement a study to measure preferred habitat characteristics for GKR and use this information for future habitat enhancement.
Objective: Utilize methods to verify if monitoring is sufficient to detect species based on sign alone for the GKR.

Compensation Measures

As noted above, the goal of the avoidance and minimization measures is to reduce the potential for take (see Appendix B). Even if the project successfully avoided all take, conversion of land suitable to support the species, may compromise and reduce the amount of suitable habitat available to the regional populations of the covered species. It has been suggested above solar farms do not render a site completely unsuitable and that a residual value of 40% remains for species such as CTS (upland habitat), WBO, GKR, and SJKF. Therefore, Solargen had developed a program for compensating for these impacts to the habitats of covered species.

The compensation program is based on the level of lost value for the covered species on the project site. The primary goal of the compensation program is to ensure that the lands proposed by Solargen to compensate contain the suitable characteristics of, and can be enhanced and restored to support the habitat features required by the species whose habitats were affected.

Solargen has identified approximately 11,000 acres of land to compensate for impacts to covered species. These lands are mostly to the north of the site (Figure 3).

The following principle will be applied to the conservation program:

- Compensation lands will be carefully tailored to reflect the relative importance of the specific lands disturbed by the PVSF. The quantitative sampling (results derived from both the distance sampling and occupancy model sampling) will be used to establish the conservation lands of both the PVSF site and the mitigation lands to ensure that the compensation lands provides habitat values and opportunities that allow the project to fully mitigate.

The following are the key elements of the conservation strategy for fully mitigating impacts to habitat for the covered species.

- Solargen will manage the identified Conservation Lands for habitat purposes only.
- Solargen will enhance the existing habitat conditions on the Conservation Lands, in order to meet the "fully mitigate" standard of CESA, through a variety of means depending on site-specific needs. For example, Conservation Lands may be suitably fenced (e.g., wildlife friendly) along public roads in order to prevent trespassing and damaging use by off-road vehicles. In other locations, Solargen may remove non-native species and/or may plant native species. These measures will be detailed in the final mitigation plan.
- Solargen has identified 11,000 acres for mitigation adjoining the project site. As the project is planned in 5 phases Solargen will place a conservation easement on 2,200 acres for each phase. Thus, prior to the construction of Phase I, Solargen will establish a Conservation Easement on 2,200 acres with an appropriate non-wasting endowment. The size of the endowment will be commensurate with the level of monitoring required for the conservation lands and estimated adaptive management activities.
- Conservation Lands will be managed for endangered species from start of the project (i.e., mitigation precedes impact).
- One year prior to the development of a new phase, Solargen will establish a Conservation Easement on 2,200 acres on the mitigation lands until such time as all 11,000 acres are protected.
- Solargen will provide a sufficient financial guarantee based on land cost, enhancement/restoration cost, management cost, etc. for all Conservation Land.

Providing enhancements will improve habitat quality for target species and therefore presumably increase carrying capacity. In addition, connectivity analysis will provide not only metrics as to the suitability of these lands in promoting regional connectivity between subpopulations, but will also provide a framework for other agencies to work toward accomplishing recovery goals beyond this project. For this plan, these lands will be managed consistent with conservation goals. The mitigation lands are a diverse and rich landscape that assist in the recovery of the covered species.

The standard for fully mitigated will be achieved by

1. discouraging and preventing permitted land use changes
2. decreasing and preventing through traffic
3. decreasing and preventing erosion caused by roads
4. preventing unauthorized access to area and providing signage informing people that they are trespassing in a protected area
5. removing trash and other debris not natural to the landscape (broken fencing, old signage, barbed wire, etc.)
6. restoring degraded areas (eroded, devegetated, disturbed) by implementing measures to prevent further erosion and revegetation with locally native plants
7. maintaining connectivity between subpopulations for target species
8. increasing the acreage of contiguous parcels of protected lands thereby decreasing edge effect

9. site specific management plans that exploit opportunities for enhancement (primarily revegetation, vegetation enhancement, grazing, removal of invasives if diminishing habitat value for target species)
10. employing species-specific enhancements

Finally, a potential long-term problem that faces covered species in this region (particularly terrestrial vertebrates) is fragmentation and the resulting effective isolation from other subpopulations. Therefore, preserving 11,000 acres of lands that support the covered species as well as other important species and promotes regional connectivity between and among populations could contribute significantly to maintaining viability for these species for the long term recovery..

Connectivity Analysis: The maintenance of habitats and connective pathways for wildlife species sensitive to human-caused landscape change is one of the most pressing issues in conservation biology. For this reason, Solargen will provide a thorough connecvitity analysis to demonstrate that these compensation lands, not only provide suitable habitat attributes for the covered species, but also provides regional connectivity for the relevant species. Appendix C provides a more detailed discussion of the methodologies to be integrated into this conservation plan.

Monitoring: We will employ the multi-season occupancy sampling to generate estimates as to change for covered species on the mitigation lands. The sampling design and effort will be based on findings on the current occupancy sampling effort that is just getting underway for the project site.

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Appendix A. Distance Sampling for the Project Site and Mitigation Lands

Methods: Distance sampling along line transects was conducted to sample burrow clusters, target species and their sign, and suitable habitat. Hand-held GPS units were used to navigate along the transects and record location data. Transect easting coordinates were determined prior to fieldwork. One or two individuals walked along each transect scanning primarily within 50 m of the transect for burrows and then out to the horizon for other target resources (target species, habitat and other wildlife). When two individuals walked together, one was an observer and one was a data recorder to ensure that no animal was counted twice.

Distance sampling methods assume that line transects are located randomly with respect to the distributions of the units of observation, that all objects are detected on the line, no movement prior to detection and accurate measurements of distances to the observations.

Data were collected on burrow clusters and other data continuously along our transects for the first several days of data collection. After February 23, burrow cluster data were collected for 50 m along the transect at 500 m intervals resulting in 2-50 m sections for every 1 km of transect walked. All other target data were collected continuously along the transect.

For the analysis, kangaroo rat burrow clusters were differentiated from giant kangaroo rats by the size of burrows and size of scat. Burrow clusters with larger burrows (3 inches vs 2.5 inches) and the presence of scat of 7mm or longer rather than 5mm in length were considered giant kangaroo rat burrows. In addition, the presence of large hindfoot tracks was also diagnostic, but this was less common due to the fact that it was early spring and the kangaroo rats were less active, and the ground was often compacted due to periodic rainfall.

The software program DISTANCE (v. 5.0; Thomas *et al*., 2005) was used to analyze the data collected from the line transect survey in order to estimate densities of kangaroo rat and giant kangaroo rat burrow clusters. In addition, depending on detection rates, estimates of densities for other target species will be made. Data preparation and analysis followed published guidelines by Buckland *et al*., 2001.

Density estimates of clustered objects (D_s) and individuals (D) were estimated using the equations $\hat{D}_s = \frac{n\hat{f}(0)}{2L}$ and $\hat{D} = \frac{n\hat{f}(0)\hat{E}(s)}{2L}$, respectively (Buckland *et al*., 2001): Where n is the number of objects detected, L is the total length of the line, $\hat{f}(0)$ is the estimated probability detection function of the perpendicular distances evaluated at zero, $\hat{E}(s)$ is the estimated expected cluster size, and $\hat{D}_s$ and $\hat{D}$ is the estimated density of clusters and individuals, respectively (objects km^2).

Final model selection was based on the lowest AIC (Akaike's Information Criterion) value (Burnham & Anderson, 1998). Goodness of fit (χ^2) was used to assess the quality of distance data and the general shape of the detection function. The data were right truncated the width of the maximum sighting distance (w) at least 5% in order to improve model fit.

Results: The burrow cluster data were compiled into two groups: the first group represents the smaller burrows including kangaroo rats, giant kangaroo rats and probable San Joaquin antelope squirrel and the second group, the larger burrows including probable San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows. We analyzed these separately.

Kangaroo rat group: The kangaroo rat burrow cluster data, which included kangaroo rat burrows, probable giant kangaroo rat burrows, and, to a lesser extent, probable San Joaquin antelope squirrel burrows as our targets, were collected in two ways: prior to February 23, we collected burrow cluster data continuously along our transects and after that date, we collected this data in discreet 50 m segments spaced every 450 m. Each of these segments was considered as a separate transect for data analysis.

Our effort resulted in 58.42 km walked in 259 transects. The transects in the Mitigation/Project area spanned both the mitigation and project lands so these were combined this into one category representing a smaller effort (6.4 km in 13 transects).

Table 1: Size of study areas, level of walking effort, number of transects for Distance analysis and number of observations used in this analysis for the kangaroo rat burrow cluster analysis

Study Area	***Area (sq km)***	***Effort (m)***	***No. transects***	***obs***
Entire	63.6	58421	259	456
Project	19.1	19279	60	75
Mitigation	44.5	32709	186	372
Mit/Proj	63.6	6436	13	9

We analyzed the entire study area for all targets combined and then post-stratified by stratum (Mitigation Area, Project Area, Mitigation/Project Area). We tested several models (13) using keys (uniform, half normal, and hazard rate) and adjustments (cosine, simple polynomial and hermite polynomial), different right truncation values, and stratified and non-stratified in DISTANCE, generally relying on the delta AIC values for model selection (lowest delta AIC value). We pooled the probability of detection function [g(0)] for stratified samples to calculate density estimates. For theses analyses, the best model (lowest delta AIC) was the hazard rate (key) plus cosine (adjustment term) with 10% truncation of largest values. In order to estimate resource densities for each stratum, we analyzed each stratum separately post stratifying by burrow cluster type using a pooled g(o) from the respective stratum. We tested 13 models for the Project Area stratum. The best model (the lowest delta AIC) was hazard rate (key) with the cosine adjustment and 5% right truncation of the highest values; the addition of a simple polynomial adjustment did not improve model fitting and the values were the same as the selected model. We tested 11 models for the Mitigation Area. The best model (the lowest delta AIC) was negative exponential (key) with the cosine adjustment with 5% right truncation of the greatest values.

The density estimates for the all targets together (Table 2, Figure 1) show that density in the Mitigation Area is greater than in the Project Area; when these density estimates are broken out by resource type, kangaroo rat densities are higher in the Mitigation Area but the GKR densities are lower (Table 2, Figure 2). When the CI is included, there is a large overlap between the two estimates (see Figure 2). The giant kangaroo rat density estimate may be somewhat misleading for the Mitigation Area due to the fact that although we measured the aerial extent of the burrow cluster and the number of burrows, we did not include in this analysis. Several giant kangaroo rat burrow clusters were very large (> 1 ac) in size and contained many burrows and likely several precincts, therefore artificially lowering the overall “density” measured when just considering this as one unit. We hope to rectify in a later more detailed analysis.

Table 2: Density estimates for all “kangaroo rat” burrow clusters for the entire study area and stratified by each study area, and for burrow cluster type (GKR = giant kangaroo rat, kangaroo rat, and probable San Joaquin antelope squirrel) for each study area (pooled detection function from each stratum).

Study Area	***Target***	***Density (per sq km)***	***%CV***	***df***	***95% CI (lower)***	***95% CI (upper)***
Entire	All (Krat, gkr, prob SJAS)	1168.6	17.22	154.99	833.8	1638.0
Project Area	All (Krat, gkr, prob SJAS)	272.8	49.27	59.93	107.4	693.3
Mitigation	All (Krat, gkr, prob SJAS)	797.7	14.87	220.29	596.0	1067.6
Mit/Project	All (Krat, gkr, prob SJAS)	98.1	86.11	12.06	19.4	496.5
Mitigation	GKR	86.7	41.65	191	39.4	190.7
Mitigation	kangaroo rat	990.7	15.46	234	731.9	1340.9
Mitigation	probable sjas	14.4	27.69	198.89	8.5	24.7
Project	GKR	144.7	79.50	76.79	35.9	583.3
Project	kangaroo rat	129.7	56.21	99.94	45.9	366.7

Figure 1: Density estimates for all target species (D±SE) in the Mitigation and Project Area

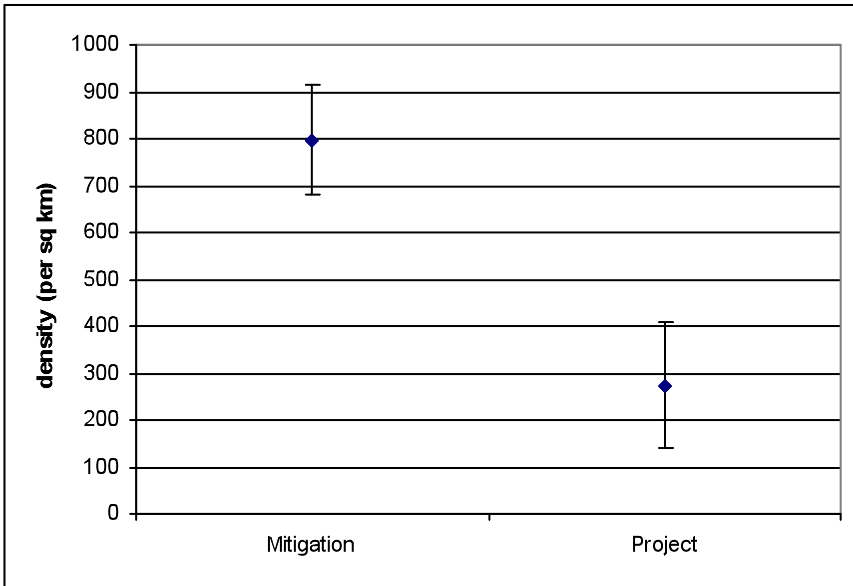
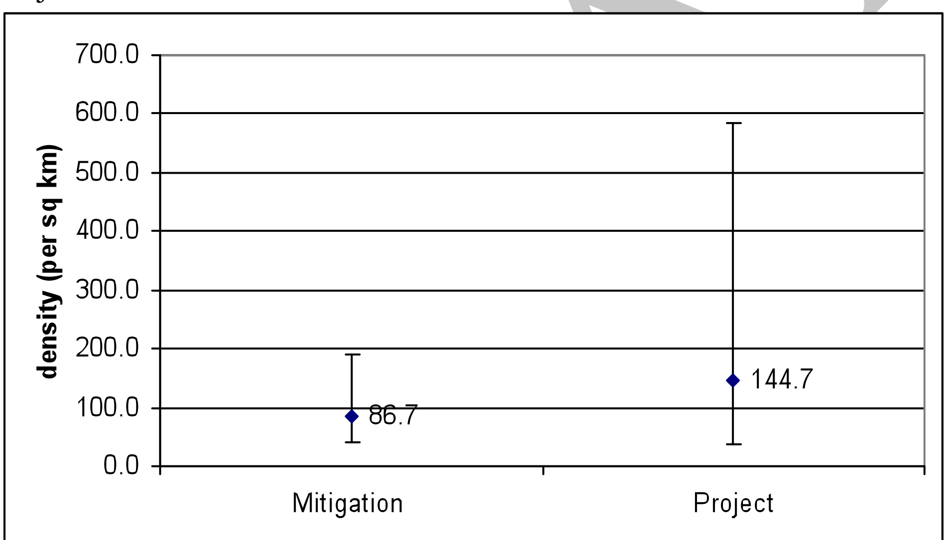


Figure 2: Giant kangaroo rat density estimates (with upper and lower CI) for the Mitigation and Project Areas.



Larger burrows: potential San Joaquin kit fox dens, badger dens, and burrowing owl burrows

We collected carnivore den, potential San Joaquin kit fox den, badger den and burrowing owl burrow location data continuously along our transects. Our total effort resulted in 162.3 km in 60 transects of effort for this analysis. We included the Mitigation/Project Area in two cases where transects were equally distributed in both the Mitigation and Project Area.

Table 3: Size of study areas, level of walking effort, number of transects, and number of observations used for this Distance analysis for potential San Joaquin kit fox den, badger dens, other carnivore dens, and burrowing owl burrows

Study Area	***Area (sq km)***	***Effort (m)***	***No. trans***	***obs***
Entire	63.6	162294	60	163
Project	19.1	40169	17	53
Mitigation	44.5	110737	43	94
Mit/Proj	63.6	11388	2	16

We analyzed the entire study area for all the data combined and then post-stratified by stratum (Mitigation Area, Project Area, Mitigation/Project Area). We tested several models (14) using keys (uniform, half normal, and hazard rate) and adjustments (cosine, simple polynomial and hermite polynomial) with different right truncation values, and stratified and non-stratified in DISTANCE, generally relying on the delta AIC values for model selection (lowest delta AIC value). We pooled the probability of detection function [g(0)] from the entire effort to calculate density estimates for stratified samples. For theses analyses, the best model (lowest delta AIC) was the uniform (key) plus cosine (adjustment term) with 10% right truncation of largest values.

We detected burrowing owl burrows (n = 12), badger dens (n = 12), potential San Joaquin kit fox dens (n = 130), generic carnivore dens (n = 10), coyote dens (n = 8) and a red fox den (red fox observed). San Joaquin kit fox presumably would use most of these structures for shelter and denning with the exception of the larger coyote dens.

The density estimate for the Project Area is greater than the Mitigation Area with overlapping confidence intervals (CI) (Table 4, Fig. 3); standard error bars show some separation of the estimates but the error bars overlap (Fig. 4). I am not at all sure why the density estimate for the Entire study area is so much higher than the other three estimates. The few number of transects walked for the Mitigation/Project Area (n = 2) contributed to the very large CI for this estimate; it is only included here to show why the Entire study area estimate is greater than the other estimates.

Table 4: Density estimates for target resources (potential San Joaquin kit fox den, badger dens, other carnivore dens, and burrowing owl burrows) for the entire study area stratified by each study area. (*D* = density)

Study Area	Target	*D* (per sq km)	%CV	df	95% CI (lower)	95% CI (upper)
Entire	Carnivore dens and burrowing owls burrows	131.9	19.89	4.29	77.5	224.7
Project Area	Carnivore dens and burrowing owls burrows	48.7	26.48	22.01	28.4	83.6
Mitigation	Carnivore dens and burrowing owls burrows	31.3	21.50	65.33	20.5	47.9
Mit/Project	Carnivore dens and burrowing owls burrows	51.9	36.48	1.18	2.2	1234.1

Figure 3: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI (see Table 3 above) for each study area.

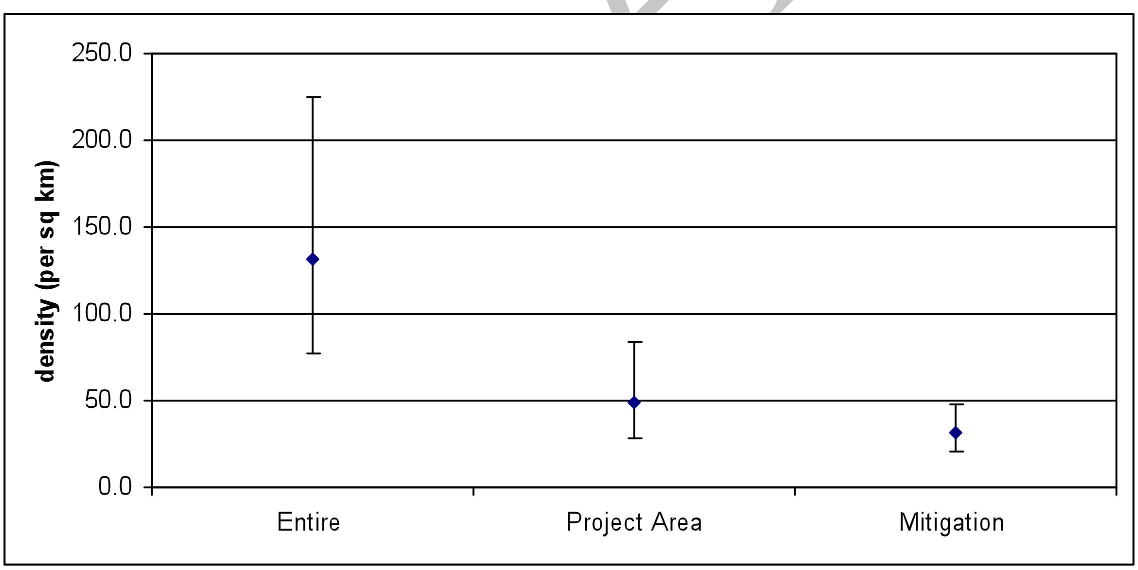


Figure 4: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI (see Table 3 above) for the Mitigation and the Project Area.

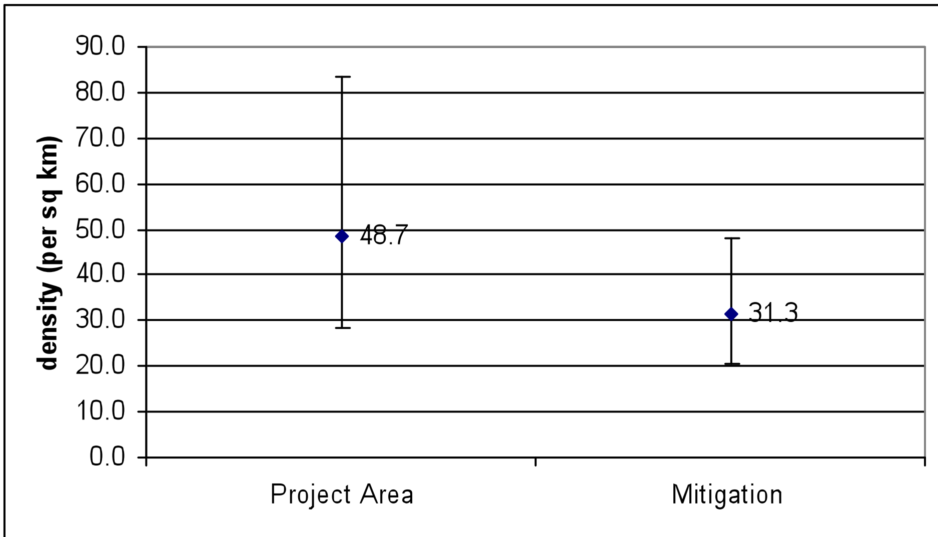
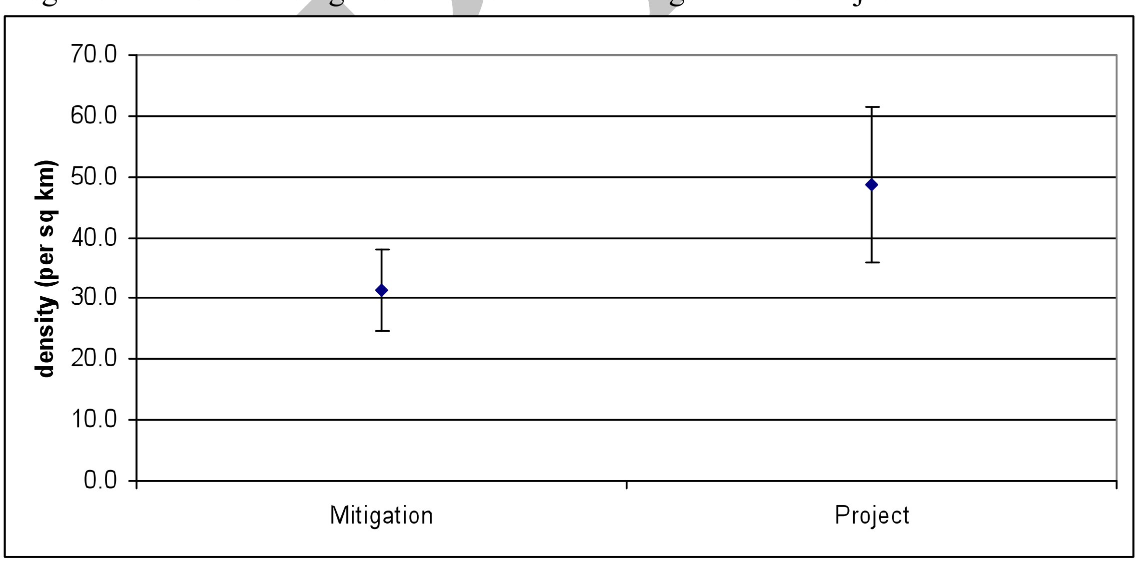


Figure 5: Density estimates (D±SE) for potential San Joaquin kit fox dens, other carnivore dens, badger dens and burrowing owl burrows for the Mitigation and Project Areas



APPENDIX B: Best Management Practices

All employees and contractors will be made aware of the BMPs, and those BMPs that are pertinent to employee work conduct will be implemented. They are listed below.

a) Prior to surface disturbance or other covered activity, a qualified wildlife biologist shall conduct a Covered Species education program (tailgate briefing) for all project personnel. Topics to be discussed during the briefing shall include: occurrence and distribution of Covered Species in the project area, take avoidance measures being implemented during the project, reporting requirements if incidental take occurs, and applicable definitions and prohibitions under the California Endangered Species Act.

b) All activities that will result in permanent or temporary ground disturbances shall be preceded by a preconstruction survey conducted by a qualified biologist. The biologist(s) shall identify and clearly mark the location of areas where Covered Species was/were identified, dens or burrows and habitats of Covered Species that are to be avoided Appropriate buffers will be established with highly visible markers. When burrows or dens are to be destroyed, a qualified biologists will determine when excavation procedures should be employed to protect individual covered species and when it is not necessary.

c) For some projects, a qualified biologist may determine that [a] biological monitor(s) shall be present while ground disturbing activities are occurring based on the sensitivity of the habitat in which a project occurs. In addition to conducting preconstruction surveys for the project, the biological monitors shall aid crews in satisfying take avoidance criteria and implementing project mitigation measures, will document all pertinent information concerning project effects on Covered Species, and shall assist in minimizing the adverse effects of project activities on Covered Species. Biological monitors shall accompany vehicles and crews throughout the project area if the qualifying biologist considers it necessary in order to avoid sensitive resources.

d) Biological monitors are empowered to order cessation of activities if take avoidance and/or mitigation measures are violated and will notify Solargen's environmental representative.

e) Unless otherwise allowed under preconstruction procedures (see discussion of b above), all known and potential San Joaquin kit fox dens, known or detected giant kangaroo rat burrows, known or detected San Joaquin antelope squirrel burrows, burrows inhabited by blunt-nosed leopard lizards, blunt-nosed leopard lizard habitat, burrowing owls burrows, shall be protected by implementing the following procedures:

The following table lists avoidance criteria for listed wildlife resources and conditions are as follows:

AVOIDANCE CRITERIA	
Type of Sensitive Area	**Radius of Buffer Zone in Feet**
Occupied kit fox den	100
Known kit fox den	100
Known kit fox natal den	150

Occupied kit fox natal den	200
Potential kit fox den	50
Giant kangaroo rat burrows (active and inactive)	50
San Joaquin antelope squirrel burrows	50
Occupied blunt-nosed leopard lizard burrows	50
Rodent burrow in wash (blunt-nosed leopard lizard habitat)	30
Burrowing owl burrows (breeding season)	250
Burrowing owl burrow (non-breeding season)	150

f) Unless biological monitors allow alterations to routes, all project vehicles shall be confined to existing roads or prominently staked and/or flagged access routes that are surveyed prior to use. All observed Covered Species and their habitat features such as dens, burrows or specific habitats shall be flagged as necessary to alert project personnel to their presence. All project-related flagging shall be collected and removed after completion of the project.

g) Where feasible, Solargen shall make every reasonable effort to avoid the collapse of dens and burrows where practicable by relocating project elements or by using other means as determined to be appropriate. When these features cannot be avoided, a qualified biologist will oversee the excavation and/or collapse of burrows or dens.

h) Biological monitors shall keep an accurate tally of the number of sensitive resources (as listed above) that are damaged, destroyed, or otherwise affected by project activities. Additionally, monitors shall estimate the number of small mammal burrows damaged, destroyed, or otherwise affected. Total number of dens and burrows affected by the project shall be reported in the post-activity compliance report and entered into a central database developed expressly for that purpose.

i) Potential kit fox dens that cannot be avoided may be excavated and back-filled pursuant to USFWS guidelines (June 1999) without prior notification, provided that excavation is approved and supervised by a biological monitor or other qualified biologist. Destruction of all kit fox dens shall be reported in the post-activity compliance report.

j) Solargen shall appoint an company representative who will be the contact source for any employee or contractor who inadvertently kills or injures a Covered Species or who finds a dead, injured, or entrapped individual or who finds a dead, injured or entrapped covered animal species. The representative will be identified during the pre-performance educational briefing.

k) Any contractor, employee(s), or other personnel who inadvertently kills or injures a covered animal species shall immediately report the incident to their representative. The representative shall contact the Solargen's environmental representative and, if feasible, a qualified biologist. Solargen will contact CDFG immediately in the case of a dead, injured, or entrapped listed species. The covered Species CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The qualified biologist will also document all circumstances of death, injury or entrapment of

Covered Species. The biologist will 1) take all reasonable steps to enable the individual animal to escape should it be entrapped, 2) contact CDFG or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured, and 3) document circumstances of death in writing and if possible photographing dead animal *in situ* prior to moving.

l) USFWS and CDFG shall be notified in writing within three (3) working days in the event of an accidental death or injury of a San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, or San Joaquin antelope squirrel or of the finding of any dead or injured kit fox, giant kangaroo rat, blunt-nosed leopard lizard, San Joaquin antelope squirrel for other Covered Species. Notification shall include the date, time, and location of the incident or of the finding of a dead or injured animal, and any other pertinent information. The USFWS contact for this information is the Endangered Species, Program Field Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825, (916) 414-6600. The CDFG contact information is 1416 9th Street, Sacramento, CA 95814, and (916) 654-4262. Any dead or injured kit fox, giant kangaroo rat, blunt-nosed leopard lizard, or San Joaquin antelope squirrel shall be turned over to the California Department of Fish and Game's Environmental Services Division, Fresno Regional Headquarters at (209) 445-6152 at the agency’s request. The dead covered animal can be transported to California State University at Bakersfield or the Endangered Species Recovery Team in Bakersfield for storage and research if CDFG approves.

m) To prevent inadvertent entrapment of Covered Species, all open holes, steep-walled holes, or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks (wooden planks should be more no less than 10 inches in width and should reach to bottom of trench). Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals.

n) All spills of hazardous materials shall be cleaned up immediately in accordance with the Solargen Spill Prevention Control Plan.

o) Pets are prohibited at the PVSF.

p) Firearms are prohibited at the PVSF.

q) All food-related trash, such as wrappers, cans, bottles, bags, and food scraps shall be disposed of daily in containers with secure covers and regularly removed from project sites.

r) Use of rodenticides and herbicides in project areas is prohibited with the exception of those applied near buildings/critical facilities. Only agency approved compounds will be applied (if necessary) by licensed applicators in accordance with label directions and other restrictions mandated by U.S. Environmental Protection Agency, County Agricultural Commissioner, regional label prescriptions on use, California Department of Food and Agriculture, and other State and Federal legislation.

s) All project-related vehicles shall observe a speed limit of 25 mph or less on all except as posted on State and County highway/roads or paved facility roads.

t) Motorized vehicles are prohibited within occupied Covered Species habitat. If not avoidable, that area will be considered temporarily disturbed and size will be limited in width to 25 feet (12.5 feet on either side of the centerline).

u) Appropriate measures shall be undertaken to prevent unauthorized vehicle entry to off-road survey routes in sensitive habitat areas. Signing will be the preferred method to discourage use.

v) Project vehicles shall be confined to existing primary or secondary roads or to specifically delineated project sites (i.e., areas that have been surveyed and described in existing documentation). Otherwise, off-road vehicle travel is not permitted.

w) Upon completion of any project, all areas that are significantly disturbed and not necessary for future operations, shall be stabilized to resist erosion, and revegetated and re-contoured if necessary, to promote restoration of the area to pre-project conditions.

Employee Education Program

The Employee Education Program familiarizes Solargen employees and contractors with BMPs and other measures regarding Covered Species. This program is designed to ensure all personnel who work at the PVSF are aware of and can identify the Covered Species and the measures implemented to protect these species. In addition, contact names and numbers are given to which personnel can report incidents regarding Covered Species.

An employee environmental program (awareness) will be administered to all new employees and to all other employees every 2 years. Upon completion of the program, the employees are given a badge that is required for admittance onto the PVSF. Badges will include the employee's picture and will be color-coded and dated in order to show that the employee is current with required training.

Prior to beginning work at the PVSF, all new employees, contractors, and other personnel that work at the PVSF and associated right-of-ways will complete an employee education program that includes a section on Covered Species awareness. Personnel must take the Employee Education Program administered test. Training included in the Employee Education Program pertains to Covered Species' identification, Covered Species' basic natural history, components of avoidance and minimization program, familiarity with preconstruction surveys and what they are and how they are administered, BMPs, and how to report incidents involving Covered Species.

The employee or contractor for PVSF will be shown examples (i.e., pictures) of Covered Species and their burrows, dens, nests or other sign. Basic natural history facts for each of the Covered Species will be included in information given to employees. All BMPs will be provided in easy to carry pamphlets for reference while working at the PVSF and lands within the 2-mile buffer.

A review of the BMPs will be conducted for each employee and a test will be administered to verify that employees have a familiarity with the provisions in the BMPs.

Appendix C. Connectivity Analysis

The fate of wide-ranging species depends critically on planning efforts that simultaneously consider the habitat requirements and ecological processes that motivate animal movement over long distances. However, planners require more specific information on the features of wildlife habitat that promote or impede the linkage and maintenance of population core areas on large landscapes, including vegetation, topography, and anthropogenic barriers.
The space use needs of large mammals are rarely considered at spatial scales relevant to the species. Often these efforts are based on legal and not bioregional boundaries and, as such, cannot easily accommodate the conservation of wildlife habitats that extend beyond the legal boundaries of sites or planning efforts. In addition, simplistic attempts to identify "movement corridors," usually focus on delineating "corridors," which can best be defined as "routes that facilitate movement of organisms between habitat fragments" (Hilty et al. 2006:5). Corridor delineation efforts, however, typically invoke simplistic judgment-based exercises describing static habitat patterns, and do not explicitly integrate the ecological *processes* of animal movement (e.g., dispersal). Moreover, corridor studies tend to occur at relatively small spatial scales and emphasize one (or few) possible pathways between patches of habitat presumed to be suitable. For example, some rely on the non-statistical least cost path (LCP) or least cost corridor (LCC) method to identify "wildlife corridors," as it is widely available as a free extension to ArcGIS and relatively simple to run. The challenge is that due to the unrealistic assumptions (e.g., animals have perfect knowledge of their landscape) and overly simplistic results of a single "optimal" corridor, conservation efforts for rare or sensitive species are more likely compromised than benefited.

Some have tried to circumvent the inherent problems with LCP by a tortuous process of rerunning the model with different end points to define multiple pathways. However, all that this accomplishes is to compound the intrinsic flaws of the LCP model, and unfortunately for the untrained eye, provides a "reasonable" facsimile of how species move between and among suitable habitat patches. Sadly, this approach merely legitimizes a non-statistical and highly flawed modeling methodology and its resultant "solution." This is why landscape ecologists have argued that complex connectivity measures that not only take into account the movement abilities of the species, but also the distances to all possible population sources, perform better at defining the connectedness of a landscape (Moilanen and Nieminen 2002, Lindenmayer and Fischer 2006). While it is desirable to strive for parsimony (e.g., Ockham's Razor) in deriving spatial models, it is a fallacy to believe that overly simplistic models are parsimonious – it is a bit counter-intuitive, but complex models that do a better job of approximating reality are in fact more parsimonious than simple models that are based on seriously flawed assumptions (e.g., LCP). For example, it is a tautology (i.e., circular) to run a LCP analysis several times trying to identify multiple pathways as the artificial placement of end points "pre-determines" the pathway. Thus it is a fallacy to believe the multiple LCP runs accomplish the type of analyses that Moilanen and Nieminen (2002) were advocating.

Indeed, when recommended mitigation areas are improperly identified there can be great risk to both animals and resource investments. In this context, landscape-level approaches and predictive, probabilistic models that are rigorously derived and ecologically meaningful are needed.

San Joaquin Kit Fox: The movements of wide-ranging animals, such as the kit fox, are most influenced by the dominant attributes of the habitat mosaic to be navigated, namely vegetation. At the moment, we propose to rely on currently available spatial data on vegetation communities in California which have been derived at a 30-100-m resolution using satellite imagery acquired during the previous decade (e.g., CALVEG, Landfire). We will use USGS digital elevation models (DEMs; 10m) to derive multiple terrain features, including topographic position and landscape ruggedness. Each of these data layers will be subjected to a formal process of expert and literature review in order to vet, classify, and weight each layer (i.e., "variable") entering into the habitat and connectivity models described below. Typically, 6 to 8 variables are selected and integrated into these analyses. All data layers and models will be derived using cutting-edge remote sensing and geographic information system applications where appropriate.

As we did for the cougar model in Southern California, the vegetation cover map will not simply be a ranking of various cover classes but the ensuing vegetation map will incorporate patch metrics. In other words, the subsequent value of a pixel will be integrated into the neighborhood by which it is surrounded. This considers the fact that the adjacent land cover types influence the importance of a habitat type for a target species. For example, riparian habitat within a mosaic of oak woodland and chaparral habitats is of higher value for a cougar than riparian habitat contained entirely within an urban matrix. In other words, context is important.

We will develop an expert-based model of habitat suitability for San Joaquin kit fox using the relevant habitat data layers and relying on the ranking of 4 or 5 experts. On a continuous scale of 0–1000, each expert will score the relative likelihood of each habitat attribute, or "class" (at the scale of the 30-m grid cell) to "support or sustain the day-to-day behaviors of an individual kit fox within an established home range." Scored values of 1000 indicate "most likely" and values of 0 indicate "not capable." We will use a quantile classification method to initially divide the distribution of cell values for the certain data layers such as topographic position, roads, developments layers into 10 suitability classes (score = 100, 200, 300, …, 1000, where 100 was lowest and 1000 was highest).

We will use a modification to the GIS-based Weighted Linear Combination (WLC) procedure described by Malczewski (2000) to average habitat class score values and to weight and combine individual habitat data layers. We will compute an average expert-defined habitat class score value and create a new layer that assigns this value to each cell in that habitat class. Separately, individual experts will be requested to assign an importance value (on a continuous scale of 0–1000) to each of the habitat layers and will compute a "swing weight" (sensu Malczewski 2000) for each layer by dividing its importance value by the sum among all importance values. Briefly, swing weights are derived by asking an expert to compare a change, or swing, from the least- to most-suitable habitat class value for a given habitat layer to a similar change in another habitat layer, and scoring the importance of all layers accordingly. Next we will create a preliminary habitat suitability layer by calculating the average importance value from among all experts, computing a new swing weight for each layer, and then multiplying this value by the average expert-defined habitat class score value at each cell. We will then add the products for each of the final layers together. Finally, we will reclassify these new values using a GIS algorithm that identifies four quartile breaks in the data distribution, where the 75th percentile represents the highest suitability areas. We will use this more parsimonious classification (1=low suitability and 4=high suitability) as our final habitat suitability layer.

To characterize potential large core habitat areas on the study area, we will use a circular moving window and focal-majority operation in the GIS to identify contiguous areas with the highest habitat suitability values that are within a suitable radius (i.e., radius will be based on average home range size for the region) of each 30-m cell on the study area. Importantly, we will consider core habitat areas to be large patches of contiguous high suitability habitat, typically nested within broader suitable areas on the landscape, and that are capable of supporting the minimum prey and cover requirements for source and destination populations of dispersing kit fox.

A key ecological principle is that on large landscapes with suitable and well-connected habitat features, greater numbers of low resistance pathways will permit greater current (or energy) flow between pairs of nodes. That is, greater connectivity among populations or core patches is predicted when more connected pathways are available. Because they have a solid mathematical foundation in random walk theory and probabilistically incorporate all possible pathways linking habitat features, circuit-theoretic models convey greater realism than more common analytical approaches, such as least-cost path analysis (see McRae et al. 2008).

We will use a similar approach for identifying regional connectivity issues for GKR

McCORMICK
BIOLOGICAL, INC.
Biological Sciences – Inventory, Permitting, and Planning

MEMORANDUM

Date: **March 13, 2015**

To: Jennifer Kaminsky

Of: Burns and McDonnell Engineering Company, Inc.

From: Randi McCormick, Principal Biologist

Subject: Early season rare plant surveys of Panoche Solar Project Footprint

Purpose

The purpose of this memorandum is to briefly document an early season rare plant survey conducted by McCormick Biological, Inc. on the Panoche Solar Project Footprint (approximately 2,506 acres) plus a buffer of at least 100 feet located in San Benito County, California (Attachment 1). In addition, eight wire pull sites, three guard structure sites, four temporary work areas, All Dielectric Self-Supporting (ADSS) pole sites and one helicopter landing zone were surveyed. These areas are located within natural lands that represent potential habitat for rare plant taxa along the proposed telecommunications routes for the Panoche Valley Solar Project (Project) within Pacific Gas &Electric (PG&E) right-of-way in San Benito and Fresno Counties. These surveys were conducted in compliance with MM BR-3.1 of the draft Supplemental Environmental Impact Report for the Revised Project.

Survey

Survey methods were consistent with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2009) (Protocols). Each of the Project components was surveyed by qualified botanists using walking transects spaced no more than 20 meters apart. Special attention was given to areas of unusual soils and high species diversity. Reference sites that were located within approximately ten miles of the Project Footprint were surveyed for three early season rare plant species, San Joaquin wooly threads (*Monolopia congdonii*), forked fiddleneck (*Amisinckia furcata*), and Panoche peppergrass (*Lepidium jaredii* ssp. *album*), to verify survey timing. All three of these taxa were verified to be in a flowering and fruiting stage that enabled positive identification. Reference sites for all potentially occurring rare plant species were not visited; however, these three species were considered suitable proxies for verification of appropriate timing for potentially occurring early flowering plant species. Several of the target rare plant species are expected to flower later in the season. GPS points were taken to enable follow-up surveys for the plants in these genera that could not be identified during the survey

All plant taxa encountered were identified to the extent possible. Identifications were made using keys contained in The Jepson Manual: Vascular Plants of California (2nd Edition) (2012) and updates found in the Jepson eflora (http://ucjeps.berkeley.edu/IJM.html), containing revisions to taxonomic treatments. Plant identifications were made using a 10x or greater magnification field hand lens and/or were collected and identified using a dissecting microscope.

When encountered, observations of special-status plant species were documented as follows: coordinates were recorded using a handheld global positioning unit, number of plants in the population was counted (<50 individuals) or estimated (>50 individuals), percent of population flowering, vegetative, and/or in fruit was estimated. If enough individuals were present, a voucher specimen was collected following standard botanical collecting guidelines.

The survey was conducted between March 3 and March 13, 2015. Between five and seven surveyors walked parallel transects on the Project Footprint and the 100 foot buffer. Each of the PG&E telecommunications elements was inventoried by one to two surveyors. The target list of rare plants was compiled in the Panoche Valley Solar Project Final EIR, and is shown in Table 1 below:

Table 1: Target List of Rare Plant Species

Species	Status	Flowering Period	Comments
Amsinckia furcata Forked fiddleneck	CRPR 4.2	March-May	
Androsace elongata ssp. *acuta* California androsace	CRPR 4.2	February-April	
Antirrhinum ovatum Oval-leaved snapdragon	CRPR 4.2	May-July	
Astragalus macrodon Salinas milk vetch	CRPR 4.3	April-June	
Astragalus rattanii var. *jepsonianus* Jepson's milk vetch	CRPR 1B.2	April-June	
Atriplex cordulata var. *cordulata* Heartscale	CRPR 1B.2	June-July	
Atriplex coronata var. *coronata* Crownscale	CRPR 4.2	March-October	
Atriplex coronata var. *vallicola* Lost Hills crownscale	CRPR 1B.2	April-September	
Atriplex depressa Brittlescale	CRPR 1B.2	June-October	
Atriplex joaquiniana San Joaquin spearscale	CRPR 1B.2	April-September	
Atriplex minuscula Lesser saltscale	CRPR 1B.1	April-October	
Atriplex subtilis Deltoid bract saltbush	CRPR 1B.2	June-October	
Blepharizonia plumosa Big tarplant	CRPR 1B.1	July-November	
California macrophylla Round leaved filaree	CRPR 1B.1	March-July	

Camissonia benitensis San Benito evening primrose	FT, CRPR 1B.1	April-June	
Campanula exigua Chaparral harebell	CRPR 1B.2	May-June	
Caulanthus californicus California jewelflower	FE, SE, CRPR 1B.1	February-April	
Caulanthus lemmonii Lemmon's wild cabbage	CRPR 1B.2	March-May	
Chorizanthe ventricosa Priest Valley spineflower	CRPR 4.3	May-September	
Chlorophyron molle ssp. *hispidum* Hispid bird's beak	CRPR 1B.1	June-September	
Deinandra halliana Hall's tarplant	CRPR 1B.1	April-May	
Delphinium californicum ssp. *interius* California larkspur	CRPR 1B.2	April-June	
Delphinium gypsophilum ssp. *gypsophilum* Pinoche Creek larkspur		March-June	
Delphinium recurvatum Recurved larkspur	CRPR 1B.2	March-June	
Eriastrum hooveri Hoover's eriastrum	CRPR 4.2	March-July	
Eriogonum gossypinum Cottony buckwheat	CRPR 4.2	March-September	
Eriogonum nudum var. *indictum* Naked buckwheat	CRPR 4.2	April-December	
Eriogonum temblorense Temblor buckwheat	CRPR 1B.2	April-September	
Eriogonum vestitum Idria buckwheat	CRPR 4.3	April-August	
Fritillaria falcata Talus fritillary	CRPR 1B.2	March-May	
Fritillaria viridea San Benito fritillary	CRPR 1B.2	March-May	
Lagophylla diabolensis Diablo Range hare leaf	CRPR 1B.2	April-September	
Layia discoidea Rayless layia	CRPR 1B.1	May	
Layia heterotricha Pale yellow layia	CRPR 1B.1	March-June	
Layia munzii Munz's tidy tips	CRPR 1B.2	March-April	
Lepidium jaredii ssp. *album* Panoche pepper grass	CRPR 1B.2	February-June	
Leptosiphon ambiguus Serpentine leptosiphon	CRPR 4.2	March-June	

Madia radiata Golden madia	CRPR 1B.1	March-May	
Malacothamnus aboriginum Gray bushmallow	CRPR 1B.2	April-October	
Monolopia congdonii San Joaquin woollythreads	FE, CRPR 1B.2	February-May	
Navarretia nigelliformis ssp. *radians* Adobe navarretia	CRPR 1B.2	April-July	
Navarretia prostrata Prostrate navarretia	CRPR 1B.2	April-July	
Phacelia phacelioides Mt. Diablo phacelia	CRPR 1B.2	April-May	
Senecio aphanactis California groundsel	CRPR 2B.2	January-April	
Streptanthus insignis ssp. *lyonii* Arburua Ranch jewelflower	CRPR 1B.2	March-May	
FE = Federally Endangered SE = State Endangered <u>CRPR = California Plant Rank (California Native Plant Society)</u> 1B = Plants that are rare, threatened, or endangered in California and elsewhere 4 = A watch list; plants of limited distribution 0.1: Seriously endangered in California 0.2: Fairly endangered in California 0.3: Not very endangered in California			

Findings

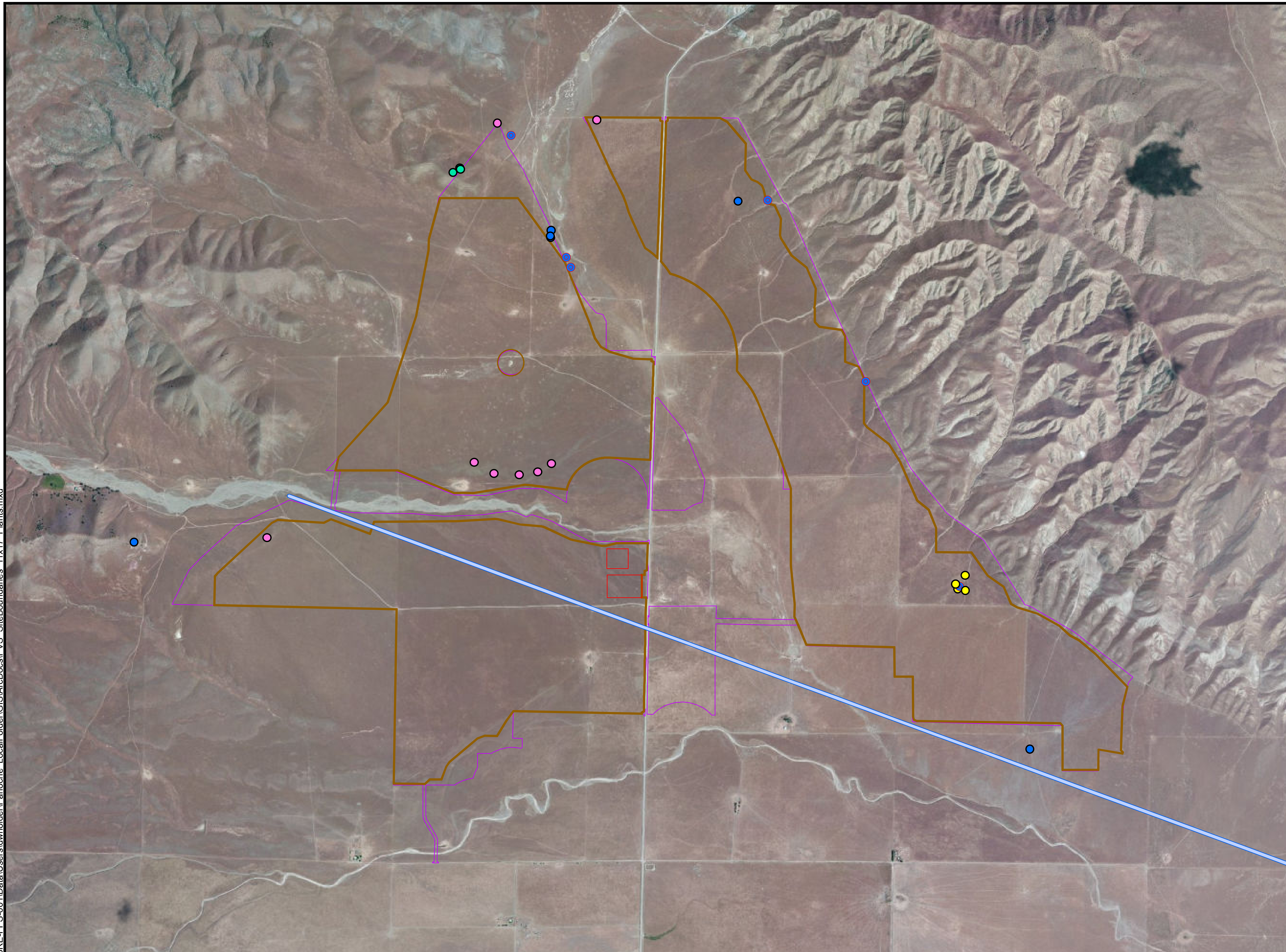
No federal or state listed rare, threatened or endangered plant species were observed within the survey area during this early season survey. Several plant species ranked by the California Native Plant Society were observed (See Table 1 and Figure 1). Relatively small populations of forked fiddleneck, serpentine leptosiphon, and California groundsel were found within the Project Footprint. In the region, forked fiddleneck is found at several locations numbering in the thousands, while relatively large populations of serpentine leptosiphon (10,000+) and California groundsel (50+) were found outside of the Project Footprint during the survey. The locations of these observations are shown on Figure 1 attached.

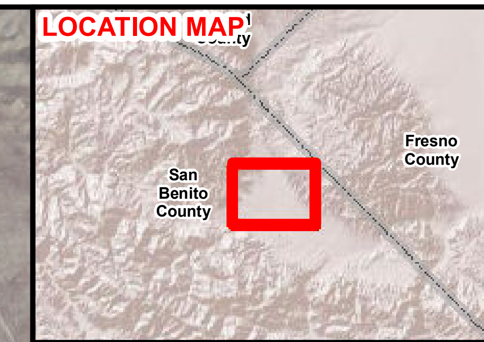
Impacts to a small portion of a population (i.e., a few individuals) of plants that are not federally or state-listed, or impacts to a population for which loss of a local population would not substantially affect the range of the species have been considered in the 2010 Final EIR and 2014 Supplement EIR, Section C.6.

Impacts to these species would be reduced through implementation of Mitigation Measures BR-G.1 through BR-G.6 which states, (1) All construction personnel participate in the Worker Environmental Education Program; (2) Best Management Practices (BMPs) for biological resources are implemented; (3) A Habitat Restoration and Revegetation Plan is developed and implemented; (4) Biological construction monitoring is implemented; (5) Conservation easements are created for permanent habitat protection as appropriate; and (6) A Habitat Mitigation and Monitoring Plan is developed and implemented for mitigation lands. MM BR-1.1 would ensure the preparation and implementation of a Weed Control Plan and MM BR-1.2 would ensure the development of a Grazing Plan for vegetation management on the site. In addition, MM AQ-1.1 would reduce impacts from fugitive dust. Finally, MM BR-3.1 would require pre-construction surveys for special-status plant species. These measures would reduce impacts to these CNPS-listed plants. A results survey report will be prepared that includes a list of all plant taxa identified during the survey and recommendations regarding follow-up surveys to fulfill the methods for comprehensive floristic surveys as described in the CDFW Protocols.

Participating Botanists

The following individuals assisted in the early season rare plant surveys for the Panoche Valley Solar Project: Marcus Jones, Ed Kentner, Russell Kokx, Eve Laeger, Randi McCormick, Gene Moise, Keir Morse, and Jordan Zylstra.





Legend

- PVS Project Footprint
- PVS Perimeter Fence
- Substation and Switchyard
- ROW

Rare Plants Locations

- Amsinckia furcata
- Leptosiphon ambiguus
- Senecio aphanactis
- Navarettia sp.
- Delphinium sp.

NORTH

4,000 2,000 0

Feet

Panoche Valley Solar, LLC

PANOCHE PROJECT BOUNDARY

RARE PLANTS

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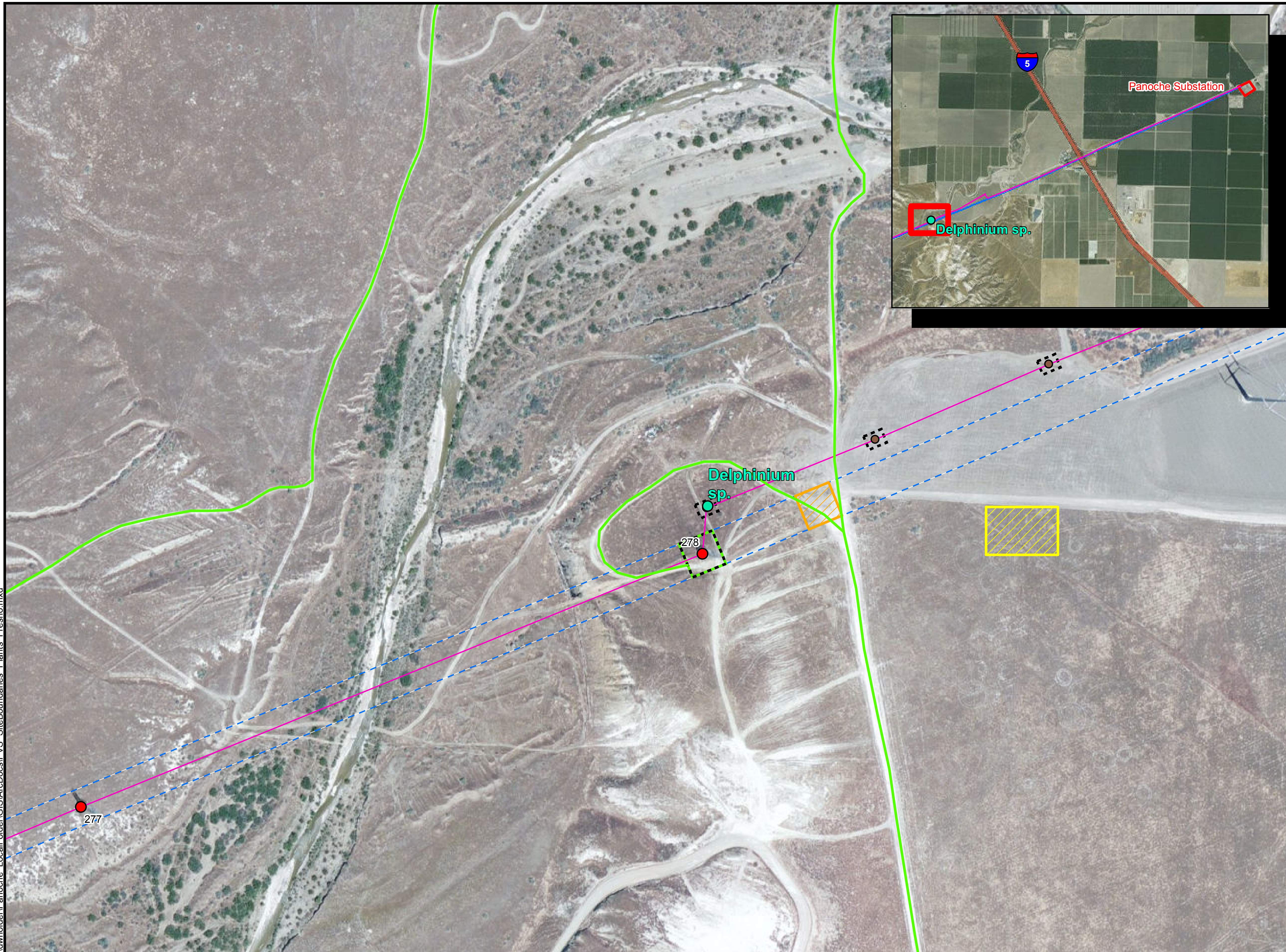
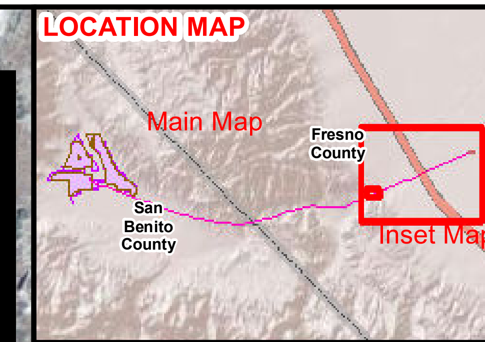
Panoche Valley Solar Project Boundary, 1:24,000, DWHolder, 1/9/2015





Legend

- PVS Project Footprint
- PVS Perimeter Fence
- Existing 12kV Poles for ADSS
- OPGW
- Access Routes
- Work Area
- Work Area - No Ground Disturbance
- Wire Stringing Site
- Helicopter Landing Zone
- ROW Boundary

Rare Plants Locations

- Delphinium sp.

NORTH

400 200 0

Feet

Burns & McDonnell
SINCE 1898

Panoche Valley Solar, LLC

PANOCHE PROJECT OPGW

RARE PLANTS

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Panoche Valley Solar Project Boundary, 1:2,400 DWHolder, 3/24/2015

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

RESULTS OF 2010 ADULT AND JUVENILE BNLL SURVEYS CONDUCTED ON SECTION 16 OF TOWNSHIP 15S, RANGE 10E FOR SOLARGEN ENERGY'S PANOCHE VALLEY SOLAR FARM

Prepared by:
Live Oak Associates, Inc.

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Michele Korpos, Senior Project Manager and Wildlife Biologist
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22 September 2010 PN: 1297-10B

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TABLE OF CONTENTS

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1 INTRODUCTION

The following is a report of findings relating to 2010 adult and juvenile blunt-nosed leopard lizard (*Gamelia sila*)(BNLL) surveys conducted by Live Oak Associates, Inc. (LOA) on a single-Section subset of land within the Panoche Valley Solar Farm project site. The proposed Solargen Energy's Panoche Valley Solar Farm is located approximately 15 miles west of Highway 5 along West Shields, Panoche and Little Panoche Roads in eastern San Benito County.

The outline of the proposed project is irregularly-shaped, and can be found in the Panoche, Mercey Hot Springs, Llanada, and Cerro Colorado 7.5 minute U.S. Geological Survey quadrangles in Sections 3, 4, 8-11, and 13-16 of Township 15 South, Range 10 East; and section 19 of Township 15 South, Range 11 East. The majority of parcels within the site are used for cattle grazing. The site is surrounded by rangeland and bordered to the west by the Gabilan Range and to the east by the Panoche Hills. A number of drainages and creeks are present in the area including the Panoche and Las Aguilas Creeks. The portion of the Valley associated with the proposed project ranges in elevation from approximately 1240 feet above sea level to approximately 1400 feet.

1.1 PROJECT DESCRIPTION

Solargen Energy Inc. proposes to construct and operate a 420 Megawatt solar photovoltaic (PV) energy generating facility that would be named the Panoche Ranch Solar Farm (Farm). This site comprises approximately 4885 acres located in the eastern portion of San Benito County.

The Farm is proposed, in part, to support California in meeting the Renewable Portfolio Standard mandate, requiring investor-owned utilities to supply 20% of their total electricity through renewable energy by the year 2010. Benefits of the proposed Farm include the following:

- Direct conversion of sunlight to electricity through the PV effect does not require water to generate electricity
- Solargen's PV panels consist of non-toxic materials such as glass, silicon, concrete and steel
- The Farm would offset potential emissions of greenhouse gases that contribute to climate change and other pollutants such as nitrogen dioxide from fossil fuel fired power plants

The Farm would be constructed on contiguous parcels of land historically used for grazing. A buffer zone with a minimum width of 35-feet would be maintained between the PV panels and surrounding land and the operation of the Farm would not interfere with adjacent land uses currently in place.

The selection of the site in Panoche Valley is based mainly on sun light, topography and proximity to the Moss to Panoche transmission line owned by PG&E. This line provides a

FIGURE 1. VICINITY MAP

unique opportunity to connect energy produced at the Farm to an existing point on the system with available electric transmission capacity. The Panoche Valley offers a relatively level valley floor, occurring between approximately 1240 and 1400 feet above sea level. The Panoche Valley area supports a strong solar resource according to the National Renewable Energy Laboratory Solar Radiation Database (http://www.nrel.gov/gis/data_analysis.html), which has collected data for the last decade on various locations around the United States. The Farm would be expected to remain in operation for at least 30 years, with the possibility of a subsequent re-powering for additional years of operation. The energy produced here would mainly benefit users in San Benito and Fresno Counties, though outlying customers would also receive a portion of their energy from the Farm.

The Farm would consist primarily of PV panels on steel support structures, which would be dark in color. These panels would be arranged in rows, with panels tilting upward and facing south or southwest. Each panel would be 7- by 8-feet and they would stand no more than 15-feet above the ground. The panels would be arranged in blocks, and each block would be supported by an inverter and transformer. These units would stand no more than 25-feet above the ground. Medium-voltage collection system lines would be buried underground. It is believed that this system, with no moving parts, no thermal cycle, no water needs, a low visual profile and underground collection system would help minimize the Farm's potential impacts to the environment.

Due to the topography of the Panoche Valley, the installation of the Farm would not require large-scale grading. The main areas of grading would occur for all-weather access roads, the Farm substation, and an operations and maintenance (OM) facility. The roads would be heavily used during the construction phase, and then rarely used for maintenance in subsequent years.

As stated previously, the Farm would not require water to generate electricity. However, some water would be required for sanitary facilities and for periodic panel cleaning. It is estimated that these uses would require approximately 10.5 acre-feet of water per year, based on a one time per year cleaning schedule. This annual water demand represents approximately 6% of that used for a similar-sized solar thermal facility, based on recent California Energy Commission information. It is estimated that the construction of the Farm would take approximately 6 years to complete, and during this time, additional water would be necessary for sanitary facilities, dust control, initial panel washing and manufacturing concrete. Solargen is exploring opportunities to clean and recycle gray water for reuse onsite. Existing onsite wells should be sufficient to serve the Farm's water needs, however thorough studies of the water resources both onsite and in the greater Panoche Valley area are planned.

An approximately 5-acre substation is proposed as part of the project, and includes an adjacent area of up to 2 acres to be occupied by an OM facility, including a small parking area. One or more cement pads would be constructed as foundations for substation equipment, and other areas would utilize a gravel substrate. An 8-foot chain link fence would be constructed around the substation. These facilities would be strategically placed adjacent to the existing PG&E Moss to Panoche 230 kV transmission line. In addition to the substation and OM facility, there would be approximately one gear switch house for every 40 inverter and transformer combinations, each of which would have similar dimensions to the inverters and transformers.

2 EXISTING CONDITIONS

2.1 BIOTIC HABITATS ASSOCIATED WITH SECTION 16 OF TOWNSHIP 15S, RANGE 10E

Ruderal Grassland: At the time of the adult and juvenile BNLL surveys were conducted (3 May to 9 July, and 2 August to 10 September 2010, respectively), Section 16 the northeast corner of the site was used as a bull pen, and the remainder of the northern half of the Section was grazed in patches during juvenile survey. The southern half of the site was more heavily grazed during the adult surveys. The vegetation on-site included ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum ssp. leporinum*) and rat-tail fescue (*Vulpia myuros*). Dominant forbs included broad-leaved filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), shining peppergrass (*Lepidium nitidum var. nitidum*) and vinegarweed (*Tricostema lanceolatum*). Fiddleneck (*Amsinckia menziesii*), shepherds purse (*Capsella bursa-pastoris*), turkey mullein (*Eremocarpus setigerus*) and bur clover (*Medicago polymorpha*) were also common, especially along ranch roads. In general, the vegetation on the northern half of the Section was much more dense than on the southern half.

2.2 HISTORY OF BLUNT-NOSED LEOPARD LIZARDS WITHIN THE GREATER 4,885 ACRES OF THE SITE

The blunt-nosed leopard lizard (BNLL) is federally listed as Endangered (11 March 1967, Federal Register 32:4001); is state listed as Endangered (27 June 1971); and is also a Fully Protected species under California Fish and Game Code Section 5050. The California Natural Diversity Database (CNDDB) contains several observations of BNLL on the Valley floor dating between 1979 and 2004.

3 METHODS

The project site is within the known range of the BNLL. Therefore, surveys for adult and juvenile BNLL were conducted on Section 16 of Township 15S, Range 10E (Figure 1), which represents the initial area, or Phase I, of proposed development for the Panoche Valley Solar Farm. These surveys were conducted following the protocol outlined in CDFG's *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004, hereinafter referred to as CDFG Guidelines.

Survey Protocol Constraints:

The currently accepted survey methodology for the BNLL requires the following:

- The maximum width that survey transects can be spaced is 30 meters
- A maximum of 4 surveys on a given site per week and 8 days of surveys within a 30-day period. At least one survey session should be conducted for 4 consecutive days
- Surveys must be conducted within the following temperatures: 25°C-35°C (77°F – 95°F)
- No surveys on overcast days (cloud cover of >90%)
- No surveys when sustained wind velocities exceed 10 mph
- Surveys may begin after sunrise when temperatures are within appropriate ranges, but must end by 1400 hours or when maximum temperatures are reached
- Surveys must be conducted by a minimum of 2 biologists

Qualifications of Researchers:

An acceptable BNLL survey crew should consist of no more than 3 **Level I** researchers for every **Level II** researcher. This restriction should reduce the number of incorrect/missed identifications. The names and affiliations of all researchers must be recorded for each survey day.

- **Level l**: Researcher has demonstrated ability to distinguish BNLL from other common lizard species that may inhabit the area
- **Level II**: Researcher has demonstrated ability to distinguish BNLL from other common lizard species that may inhabit the area and has participated in at least 50 survey days for BNLL (or 25 survey days and a BNLL identification course recognized by/acceptable to the Department of Fish and Game). Researcher has made at least one confirmed field sighting of a BNLL
- A minimum of one confirmed field sighting must be documented for each **Level II** researcher and be available to the Department upon request. As with all BNLL sightings, it should also be submitted to the California Natural Diversity Database. The Information to be included in documentation of BNLL sighting include: Name of researcher, date of survey, location of survey, names of accompanying researchers who can confirm the sighting, and details of sighting (distance, BNLL activity, etc.)

LOA Level II biologists included: Dr. Mark Jennings, Molly Gobel, Yancey Bissonnette, Steve Pruett, Karl Weiss, Missy Chase, Jayanna Miller, Jared Prat and Lisa Wifrey. LOA Level I biologists included: Dan Cordova, Jen Turner, Fabian Pereida, Jared Bigler, Colby Boggs, Neal

Kramer, Chris Bronny, Wendy Fisher, Dave Wappler, Emily Cmapbe, Lidia D'Amico, Danielle Castle, Cecile Shohet, Andy Huck and Katrina Huck.

FIGURE 2 AREA SURVED

LOA conducted adult BNLL surveys, following the CDFG Guidelines, between 3 May and 9 July 2010. Young-of-the-year surveys were conducted between 2 August and 10 September 2010, again following CDFG Guidelines. The results of these surveys are summarized in Section 4 below.

4 RESULTS

Surveys for adult BNLL began on 3 May 2010 and were conducted most days, Monday through Friday, through 9 July 2010, weather permitting. Surveys for juvenile BNLL began on 2 August and ended 10 September 2010. As noted above, these surveys were conducted on Section 16 of Township 15S, Range 10E; the Section containing and Phase I of the proposed Panoche Valley Solar Farm. A total of 12 survey days were conducted during the adult surveys, and a total of 5 survey days were conducted for the juvenile surveys. The first adult BNLL was observed along Panoche Creek on 4 May 2010, the second day of surveys. A total of 12 adult surveys were conducted on Section 16 resulting in 37 observations of adult. Individual adult BNLL were observed throughout the survey window. Table 1 represents the dates and general location of BNLL observations during adult surveys, locations outside of Section 16 occurred outside of protocol parameters when surveyors walked the Panoche Creek wash.

Table 1. Dates and General Locations of Adult BNLL Observations (3 May to 9 July, 2010)

Date	Location*
4-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	SE 1/4
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
5-May-2010	incidental along wash, Section 15
7-May-2010	incidental along wash, Section 14
7-May-2010	incidental along wash, Section 14
7-May-2010	incidental along wash, Section 14
12-May-2010	On Southern Fence Row
12-May-2010	SE 1/4
13-May-2010	SE 1/4
13-May-2010	SE 1/4
13-May-2010	SE 1/4

14-May-2010	SW 1/4
14-May-2010	SW 1/4
14-May-2010	SE 1/4
19-May-2010	SE 1/4
25-May-2010	SE 1/4
25-May-2010	SE 1/4
25-May-2010	SE 1/4
5-Jun-2010	On Southern Fence Row
1-Jun-2010	SW 1/4
1-Jun-2010	SW 1/4
2-Jun-2010	SE 1/4
2-Jun-2010	SE 1/4
3-Jun-2010	SW 1/4
3-Jun-2010	SE 1/4
4-Jun-2010	SW 1/4
7-Jun-2010	SE 1/4
7-Jun-2010	SE 1/4
7-Jun-2010	SE 1/4
11-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
16-Jun-2010	SE 1/4
21-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
22-Jun-2010	SE 1/4
6-Jul-2010	SE 1/4

*All in Section 16 unless otherwise noted

Surveys for juvenile BNLL began on 2 August and continued until 10 September 2010. CDFG Guidelines call for a total of 5 complete surveys for juveniles, and Section 16 was surveyed 5 times following CDFG guidelines. The results were similar to the adult surveys, with BNLL being located in similar areas within Section 16 (i.e., in and around Panoche Creek). The dates and general locations of these observations can be seen in Table 2. Figure 2 graphically represents the general locations of select sightings.

Table 2. Dates and General Locations of Juvenile BNLL Observations (3 August - 1 September 2009)

Date	Location within Section 16
08/03/2010	SW 1/4
08/09/2010	SE 1/4
08/10/2010	SE 1/4-4 individuals
08/17/2010	SE 1/4
09/01/2010	SE 1/4

Other grassland species (e.g., BUOW and SJKF) continued to be observed and recorded during juvenile BNLL surveys. The general location and dates of observations are shown on Figure 2.

5 SUMMARY

Adult BNLL surveys were conducted on Section 16 of Township 15S, Range 10E of the proposed Panoche Valley Solar Farm between 3 May and 9 July2010; and juvenile BNLL surveys were conducted between 2 August and 10 September 2010. BNLL adult and juveniles were observed on Section 16.

The adult and juvenile BNLL found in Section 16 were found mainly in association with Panoche Creek, which is consistent with known habitat preferences of washes and floodplains (Warrick et al., 1998), and non-native grasslands (USFWS 1998), among others. Juvenile BNLL were found along the washes and also farther away as they dispersed from their hatching sites. Section 16 supports mid to dense vegetation one main wash. The grasses in the north portion of Section 16 was much more dense than the south portion, which may prove to be too dense to support BNLL populations.

6 REFERENCES

CDFG. 2009. California Natural Diversity Data Base. The Resources Agency, Sacramento, CA.

____. *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004

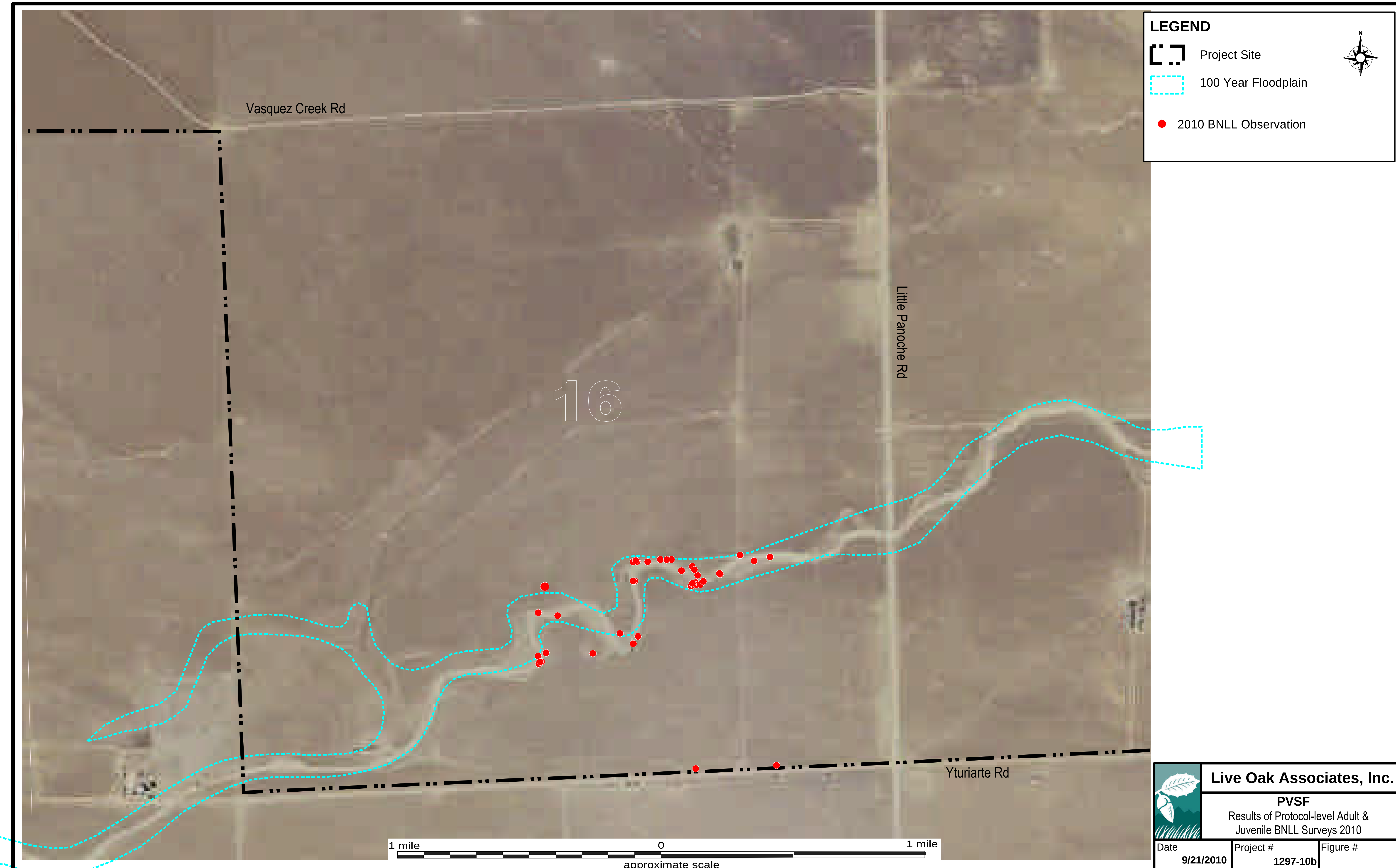
Germano, D.J. 2009. *The Number of Consensus Days Needed to Detect Blunt-Nosed Leopard Lizards*, Gambelia Sila. CDFG 95(2):106-109.

USFWS. 1998. *Recover Plan for Upland Species of the San Joaquin Valley, California*.

Warrick, G.D., T.T. Kato, B.R. Rose. 1998. *Microhabitat Use and Home Range Characteristics of Blunt-Nosed Leopard Lizards*. Journal of Herpetology, V32,N2,pp183-191.

APPENDIX A

APPENDIX B



Live Oak Associates, Inc.

PVSF

Results of Protocol-level Adult & Juvenile BNLL Surveys 2010

Date	Project #	Figure #
9/21/2010	1297-10b	

DATA REQUEST #8 – 10 September 2010

INTRODUCTION

Live Oak Associates, Inc. (LOA) conducted reconnaissance-level surveys on approximately 10,900-acres of the Silver Creek Ranch (SCR), proposed mitigation lands for the Panoche Valley Solar Farm (PVSF). These surveys were focused on blunt-nosed leopard lizards (*Gambelia sila*; BNLL), giant kangaroo rat (*Dipodomys ingens*; GKR) and San Joaquin kit fox (*Vulpes macrotis mutica*; SJKF). Observations of other species of special concern were also noted. Dr. Mark Jennings and Molly Goble conducted five days of BNLL surveys between 30 August and 3 September; Katrina and Andy Huck conducted three days of mammal surveys between 30 August and 1 September 2010; and Dr. Jim Paulus and Neal Kramer conducted three days of vegetation alliance surveys between 3 and 5 September 2010.

Each of these surveys began by visiting historic observations of relevant species as presented by the California Natural Diversity Database (CNDDB) and spot-checking those areas to determine whether they still support the species. To cover the most ground in the least amount of time, biologists drove as close as possible to historic sightings and then surveyed the areas on foot allowing the greatest amount of visual coverage. Subsequent efforts included other portions of the site that support suitable habitat for the target species. The following is a summary of effort for each segment of the reconnaissance survey.

SURVYES

<u>Vegetation Alliances</u>

Methods/Results

Map elements (vegetation alliances) identified within the study area were visited or viewed from nearby using binoculars. Boundaries between associations were drawn onto georectified 1:24,000 scale color aerial images during field reconnaissance. These polygons were then digitized to facilitate map interpretation. The typical total cover provided by the herbaceous, shrub and tree strata were observed, and a list of associations as signaled by shifts in dominant canopy species abundance was developed for each alliance present. A partial floristic inventory was conducted in concert with the mapping effort. Survey work included searching for extant riparian corridor or spring-driven habitat across the entire area. Observations of riparian habitat indicators such as surface flows, defined channels with evidence of scour, and phreatophytic species prominence were recorded. Due to the late timing of the surveys, potentially occurring rare plant species would be expected to be exhibiting late fruiting or senescing phenology, and so were past their optimal periods for identification. A table of special status plants with the potential to occur onsite is included at the end of this summary, as well as a partial inventory of plants onsite and a habitat map.

The three-day reconnaissance survey for plant alliances produced five distinct alliances. These alliances include California annual grassland, Ephedra californica shrubland, Populus fremontii forest, zonal riparian, and tamarix semi-natural shrubland (see Habitats map).

Blunt-nosed leopard lizard (*Gambelia sila*)

Methods/Results

General habitat and ocular surveys were conducted for BNLL and were concentrated where BNLL have been recorded in the past (in the CNDDB) and in those areas most likely to support BNLL habitat (e.g., barren washes and areas with sparse vegetation on friable soils). Two biologists walked abreast of one another no more than 30 meters apart, stopping from time to time and searching the surroundings through binoculars. The five days of surveys occurred within the juvenile survey period (1 August to 15 September) outlined in the CDFG's *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*, May 2004 and generally followed the survey methodology. Observations of the target species and other species of special concern were mapped using a Garmin GPS unit.

Of the portions of the SCR that were surveyed, the highest quality habitat for BNLL appears to be in the lower portions of intermittent drainages near Panoche Road. The best habitats were in the SE corner of Section 27, the eastern half of Section 34, and the SW corner of Section 35. A total of 5 juvenile BNLL were observed in these areas (see Figure entitled: Silver Creek Recon BNLL3). The general habitat for all of these areas was sandy washes bordered by rocks and boulders with an abundance of California side-blotched lizards (*Uta stansburiana elegans*). The amount of vegetation present was sparse, especially for introduced grasses.

LOA did not find any juvenile BNLL in the portions of Section 32 (near center) and 35 (in the SE corner) previously recorded by the CNDDB. This could be due to the current presence of dense amounts of vegetation in the intermittent drainages there. Vegetation is almost certainly sparser during drought or below average rainfall years, or in years when these areas are more heavily grazed.

Giant Kangaroo Rat

Methods/Results

Surveys for GKR began in those areas with historic sightings (CNDDB) of the species (primary surveys), represented as polygons on the figure entitled: Silver Creek Recon GKR3; and secondary surveys were conducted in areas with a slope of 11% or less, which represents habitat most likely to support the target species, based on literature review and conversations with the Agencies. Spot-checking involved driving as near a polygon as possible, walking meandering transects and recording observations. Observations of the target species and other species of special concern were noted and mapped with a Trimble GPS unit. Due to some overlap in size class of scat between GKR and Heermann's kangaroo rat (*Dipodomys heermanni*) at 7mm, only rat scats $\geq$ 9mm were recorded as GKR. Possible locations of GKR were mapped as a polygon or a point depending on the amount of confirmed sign. The time constraints of the survey did not allow surveying of every CNDDB polygon. However, every CNDDB polygon that was surveyed (3 of 9) via spot-checking contained confirmed sign of GKR. A small valley, not previously recorded in the CNDDB supported a large colony of confirmed GKR sign (see GKR3).

San Joaquin kit fox

Methods/Results

Surveys for SJKF began in those areas with historic sightings (CNDDB) of the species (primary surveys), represented as polygons on the figure entitled: Silver Creek Recon SJKF3; and secondary surveys were conducted in areas with a slope of 11% or less, which represents habitat most likely to support the target species, based on literature review and conversations with the Agencies. Spot-checking involved driving as near a polygon as possible, walking meandering transects and recording observations. The CNDDB polygon encompassing Section 35 is still utilized by SJKF, confirmed by SJKF scat. The only other CNDDB polygons for SJKF on the SCR occur along Panoche Road, and are presumed to be data from previous road surveys or incidental sightings. LOA identified additional locations within the site containing SJKF scat. Five individuals were observed on the night of 1 September during spotlighting surveys from ranch roads within the site.

CONCLUSION

LOA conducted a brief reconnaissance survey of approximately 10,900-acres of the SCR focusing on vegetation alliances, BNLL, GKR and SJKF. Surveys began by spot-checking historic sightings of species as presented in the CNDDB and were conducted during the juvenile BNLL survey window. LOA confirmed that areas with historic observations of GKR and SJKF are still valid. While no observations of BNLL were made in areas with historic sightings, observations of 5 juvenile BNLL were made in the first two days of surveys in areas with no previous sightings, indicating a relatively healthy population, based on Germano's (CDFG 2009) findings that when the species is abundant it takes an average of 1.18 days of survey effort to observe.

In addition to the target species, a number of other special status species were observed including the San Joaquin coachwhip (*Masticophis flagellum ruddocki*), loggerhead shrike (*Lanius ludovicianus*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni;* SJAS), and American badger (*Taxidea taxus*). Observations of SJAS were initially being GPS'd, however they were so abundant across the site it became necessary to stop recording their locations due to a short survey window and so many acres to cover.

The site also supports potential breeding habitat for the California tiger salamander (*Ambystoma californiense*) in the form of stock ponds and vernal pools. Perennial waters in the Panoche Creek with covered by stands of cottonwood (*Populus fremontii*) could potentially support suitable habitat for California red-legged frog (*Rana draytonii*), especially considering the lack of predacious fish and bullfrogs in these waters.

The *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) and the *Blunt-nosed Leopard Lizard 5-Year Review Summary and Evaluation* (USFWS 2010) identified the SCR as a targeted area for protection and subsequent recovery of the suite of upland species occurring in the Panoche Valley and greater Ciervo-Panoche Region. Considering BNLL were not observed this year in areas where they were previously observed (CNDDB), likely due to the dense vegetation occurring there, there is an opportunity to manage the site to increase suitable habitat for BNLL. Opportunities to create breeding ponds for CTS are also likely present onsite. Eradicating tamarix from the drainages would increase biotic value on many levels.

Adding the SCR to the mitigation lands for the proposed PVSF would offer the entire Ciervo-Panoche Region an opportunity to protect already high quality habitat for the suite of upland species that occurs there and enhance habitat for the same species through restoration and adaptive management.

REFERENCES

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Germano, D.J. 2009. *The Number of Consensus Days Needed to Detect Blunt-Nosed Leopard Lizards,* Gambelia Sila. CDFG 95(2):106-109.

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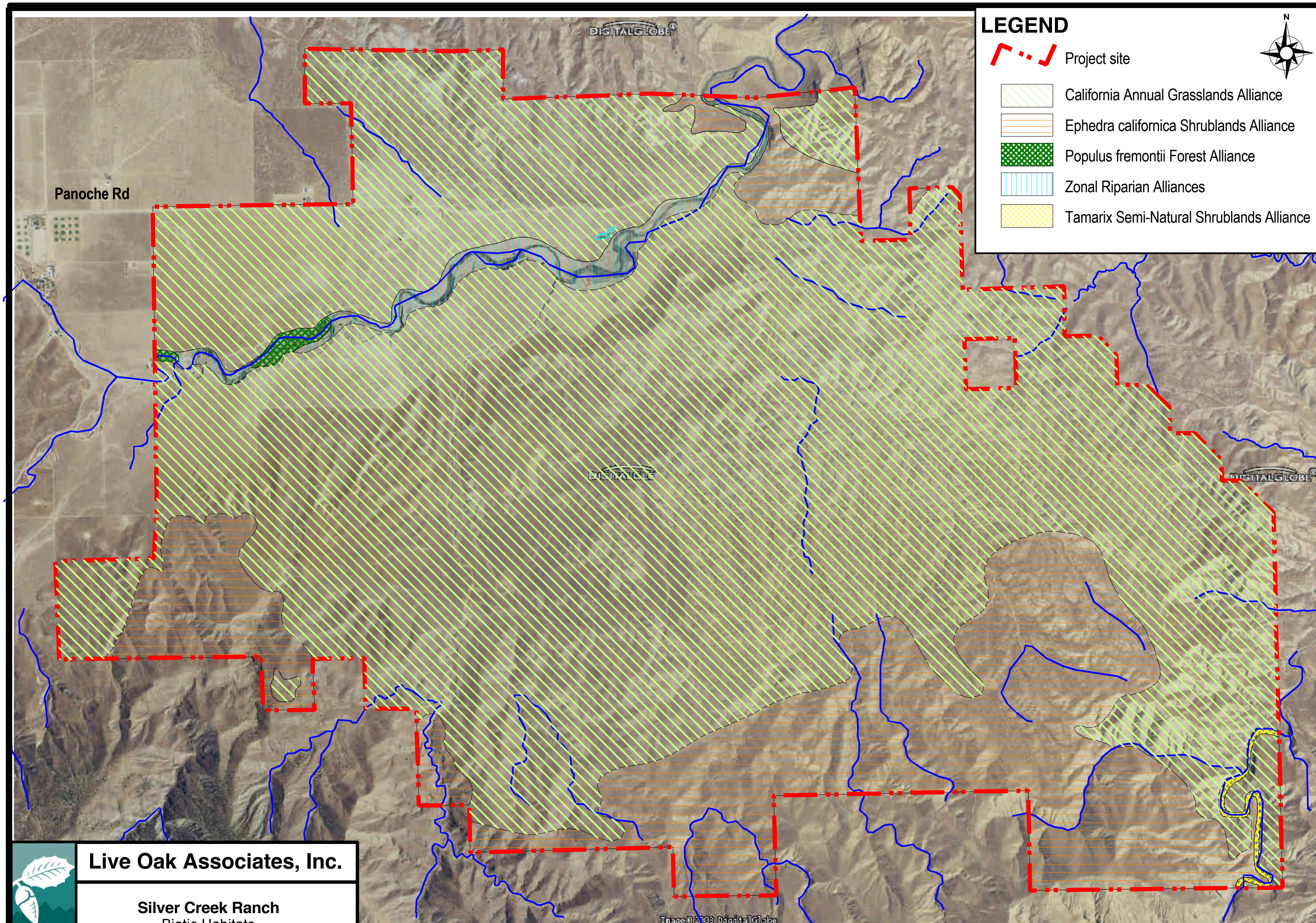


Live Oak Associates, Inc.

Silver Creek Ranch
Biotic Habitats

Date	Project #	Figure #
9/09/2010	1297-13	2

1 mile 0 1 mile
approximate scale

Aerial photo courtesy of Digital Globe

Table 1. Special status plant species that could potentially occur within the 10,903 acre Silver Creek Ranch proposed Solargen Panoche Mitigation Area. Blooming period is taken from CNPS (2001).

Species	**Status***	**Habitat**	**Blooming Period**
Santa Clara thorn-mint *Acanthomintha lanceolata* Annual herb	CNPS 4	Chaparral, woodland, rocky, often serpentine	March-June
forked fiddleneck *Amsinckia vernicosa* var. *furcata* Annual herb	CNPS 4	Woodland, grassland	February-May
Salinas milk-vetch *Astragalus macrodon* Perennial herb	CNPS 4	Chaparral, woodland, grassland	April-July
crownscale *Atriplex coronata* var. *coronata* Annual herb	CNPS 4	Chenopod scrub, grasslands, and vernal pools, alkaline soils	March-October
Lost Hills crownscale *Atriplex vallicola* Annual herb	CNPS 1B	Chenopod scrub, grasslands, and vernal pools, alkaline soils.	April-August
western lessingia *Benitoa occidentalis* Annual herb	CNPS 4	Chaparral, grassland, clay soils	May-November
round-leaved filaree *California macrophylla* Annual herb	CNPS 1B	Woodland, grassland	March-May
Lemmon's jewelflower *Caulanthus coulteri* var. *lemmonii* Perennial herb	CNPS 1B	Pinyon-juniper woodland, grassland	March-May
Hall's tarplant *Deinandra halliana* Annual herb	CNPS 1B	Chenopod scrub, grassland, clay soils	April-May
gypsum-loving larkspur *Delphinium gypsophilum* ssp. *gypsophilum* Perennial herb	CNPS 4	Chenopod scrub, grassland, clay soils	February-May

Table 1. (continued)

Species	**Status***	**Habitat**	**Blooming Period**

recurved larkspur *Delphinium recurvatum* Perennial herb	CNPS 1B	Chenopod scrub, grassland, alkaline	March-June
protruding buckwheat *Eriogonum nudum* var. *indictum* Perennial herb	CNPS 4	Scrubland, woodland, often clay or serpentine	May-December
Temblor buckwheat *Eriogonum temblorense* Annual herb	CNPS 1B	Grasslands, open slopes	May-September
Idria buckwheat *Eriogonum vestitum* Annual herb	CNPS 4	Grasslands, open slopes	April-August
pale yellow layia *Layia heterotricha* Annual herb	CNPS 1B	Pinyon-juniper woodland, alkaline grassland, clay	March-June
Panoche peppergrass *Lepidium jaredii* ssp. *album* Annual herb	CNPS 1B	Grassland, washes and alluvial fans	February-June
serpentine leptosiphon *Leptosiphon ambiguus* Annual herb	CNPS 4	Grassland, often serpentine soil	March-June
showy golden madia *Madia radiata* Annual herb	CNPS 1B	Woodland, grassland	March-May
San Joaquin woollythreads *Monolopia congdonii* Annual herb	CNPS 1B federal Endangered	Chenopod scrub, grassland, sandy	February-May
chaparral ragwort *Senecio aphanactis* Annual herb	CNPS 2	Woodland, chaparral	January-April

***California Native Plant Society (CNPS) list designations**

1B: Plants Rare, Threatened, or Endangered in California and elsewhere
2: Plants Rare, Threatened, or Endangered in California but more common elsewhere
4: Plants of limited distribution – a watch list

Appendix A**.** Partial plant list developed during field verification of plant associations present in the Solargen Panoche proposed Silver Creek Ranch mitigation area in September 2010. Nomenclature is taken from Hickman (1993) and Jepson Herbarium (2010). Wetland status is taken from Reed (1988). Status codes are given below.

Scientific Name	**Common Name**	**Wetland Status**
AGAVACEAE - Agave Family		
Hesperoyucca whipplei[1, 2]	Spanish bayonet	UPL
ALLIACEAE - Onion Family		
Allium crispum[2]	crinkled onion	UPL
APIACEAE - Carrot Family		
Lomatium utriculatum	common lomatium	UPL
ASTERACEAE - Sunflower Family		
Achillea millefolium	yarrow	FACU
Ambrosia acanthicarpa	annual bursage	UPL
Blepharizonia laxa[3]	big tarweed	UPL
*Centaurea melitensis**	tocalote	UPL
Chrysothamnus nauseosus	rabbitbrush	UPL
Deinandra kelloggii[4]	Kellogg's tarweed	UPL
Eastwoodia elegans	yellow mock aster	UPL
Ericameria linearifolia	interior/narrowleaf goldenbush	UPL
Euthamia occidentalis	western goldenrod	OBL
Gutierrezia californica	California matchweed	UPL
Helianthus annuus	common sunflower	FAC-
Isocoma acradenia var. *bracteosa*	alkali goldenbush	UPL
Iva axillaris ssp. robustior	poverty weed	FAC
*Lactuca saligna**	willow lettuce	NI*
*Lactuca serriola**	prickly lettuce	FAC
Lagophylla ramosissima[5]	common hareleaf	UPL
Lasthenia californica	common goldfields	UPL
Lessingia nemaclada	slenderstem lessingia	UPL
Micropus californicus var. *californicus*	slender cottonweed	UPL
Stephanomeria pauciflora	wire lettuce	UPL
Xanthium spinosum	spiny cocklebur	FAC+
Xanthium strumarium	cocklebur	FAC+
BORAGINACEAE - Borage Family		
Amsinckia menziesii	common fiddleneck	UPL
Amsinckia tessellata	checker fiddleneck	UPL
Heliotropium curassavicum	seaside/salt heliotrope	OBL
Phacelia tanacetifolia[6]	tansy phacelia	UPL
BRASSICACEAE - Mustard Family		
Lepidium nitidum var. *nitidum*	shining peppergrass	UPL
*Nasturtium officinale**	water cress	OBL
*Sisymbrium orientale**	oriental mustard	UPL
CARYOPHYLLACEAE - Pink Family		
Herniaria hirsuta var. *cinerea**	gray herniaria	UPL

Scientific Name	Common Name	Wetland Status
CHENOPODIACEAE - Goosefoot Family		
Atriplex argentea var. *mohavensis*	silverscale	FAC
Atriplex fruiticulosa	ball saltbush	
Atriplex lentiformis ssp. *lentiformis*	big saltbush	FAC
Atriplex polycarpa	allscale, desert saltbush	UPL
*Bassia hysopifolia**	fivehorn smotherweed	FAC
*Salsola tragus**	Russian thistle, tumbleweed	FACU
CUPRESSACEAE - Cypress Family		
Juniperus californica	California juniper	UPL
CYPERACEAE - Sedge Family		
Bolboschoenus maritimus[7]	saltmarsh bulrush	OBL
Eleocharis montevidensis	sand spikerush	FACW
Schoenoplectus americanus[8]	three square	OBL
Schoenoplectus pungens[9]	common threesquare	OBL
EPHEDRACEAE - Ephedra Family		
Ephedra californica	California ephedra, Mormon tea	UPL
EUPHORBIACEAE - Spurge Family		
Chamaesyce ocellata ssp. *ocellata*	Contura Creek sandmat	UPL
Croton setigerus[10]	turkey mullein, dove weed	UPL
FABACEAE - Legume Family		
Acacia greggii	catclaw	FACU
Astragalus didymocarpus var. *didymocarpus*	dwarf white milkvetch	
Astragalus oxyphysus	Mt. Diablo milkvetch	UPL
*Lotus corniculatus**	bird's foot trefoil	FAC
Lotus wrangelianus	California lotus	UPL
Lupinus microcarpus	chick lupine	UPL
*Medicago polymorpha**	burclover	UPL
*Melilotus indicus**	sour clover, small melilot	FAC
Prosopis glandulosa var. *torreyana*	mesquite	FACU
Trifolium willdenovii	tomcat clover	UPL
FRANKENIACEAE - Frankenia Family		
Frankenia salina	alkali heath	FACW+
GERANIACEAE - Geranium Family		
*Erodium cicutarium**	red-stemmed filaree	UPL
JUNCACEAE - Rush Family		
Juncus mexicanus	Mexican rush	FACW
Juncus ensifolius	dagger rush	FACW
Juncus xiphioides	iris-leaved rush	OBL
LAMIACEAE - Mint Family		
Salvia carduacea	thistle sage	UPL
Salvia columbariae	chia	UPL
Trichostema lanceolatum	vinegarweed	UPL

Scientific Name	Common Name	Wetland Status
ONAGRACEAE - Evening primrose Family		
Camissonia boothii ssp. *decorticans*	shredding primrose	UPL
Clarkia unguiculata	elegant clarkia	UPL
PLANTAGINACEAE - Plantain Family		
Plantago erecta	California plantain	UPL
POACEAE - Grass Family		
*Avena barbata**	slender wild oat	UPL
*Bromus diandrus**	ripgut brome	UPL
*Bromus hordeaceus**	soft chess	FACW-
Bromus madritensis ssp. *rubens**	foxtail chess, red brome	UPL
Distichlis spicata	saltgrass	FACW*
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley	FAC
Hordeum murinum ssp. *leporinum**	foxtail barley	NI
*Koeleria phleoides**	annual junegrass	
Leymus triticoides	alkali ryegrass	FAC+
Muhlenbergia asperifolia	scratch grass	FACW
Poa secunda ssp. *secunda*	one-sided bluegrass	UPL
*Polypogon monspeliensis**	rabbit's foot grass	FACW+
Vulpia microstachys	annual fescue	UPL
*Vulpia myuros var. myuros**	rat-tail fescue	FACU*
POLEMONIACEAE - Phlox Family		
Eriastrum pluriflorum	manyflowered woollystar	UPL
POLYGONACEAE - Buckwheat Family		
Chorizanthe uniaristida	one-awned spineflower	UPL
Eriogonum angulosum	anglestem buckwheat	UPL
Eriogonum fasciculatum var. *polifolium*	California buckwheat	UPL
Eriogonum gracile var. *gracile*	slender woolly buckwheat	UPL
Eriogonum nudum var. *indictum*	protruding buckwheat	UPL
Hollisteria lanata		UPL
Lastarriaea coriacea	leather spineflower	UPL
Mucronea perfoliata	perfoliate spineflower	UPL
*Rumex stenophyllus**	narrowleaf dock	NI
RANUNCULACEAE - Buttercup Family		
Delphinium sp.	larkspur	UPL
SALICACEAE - Willow Family		
Populus fremontii ssp. *fremontii*	Fremont cottonwood	FACW
Salix exigua	narrow-leaved willow	OBL
Salix laevigata	red willow	~NI
SOLANACEAE - Nightshade Family		
*Nicotiana glauca**	tree tobacco	FAC
Nicotiana quadrivalvis	indian tobacco	UPL
TAMARICACEAE - Tamarisk Family		
*Tamarix ramosissima**	saltcedar	FAC
TYPHACEAE - Cattail Family		
Typha latifolia	broadleaf cattail	OBL

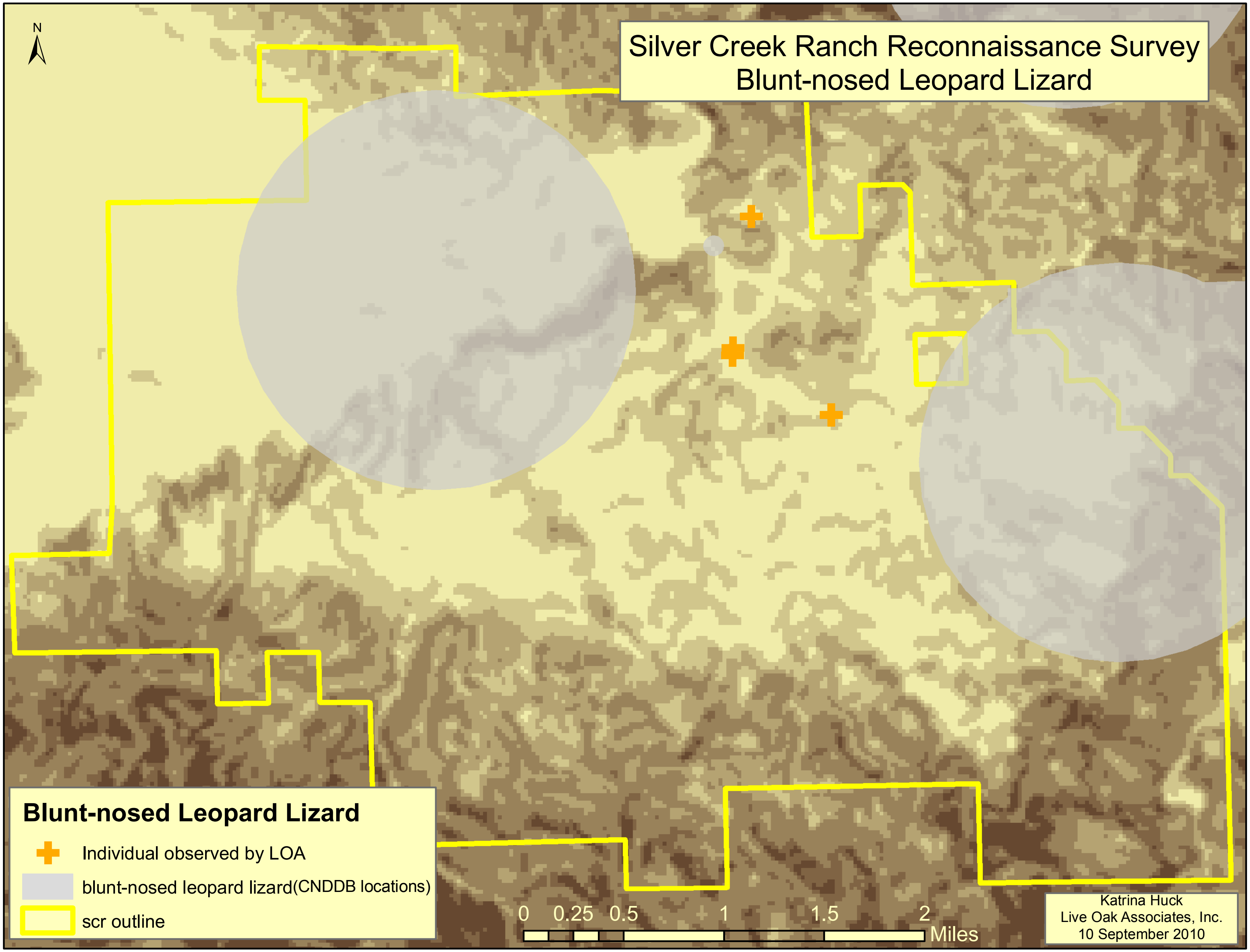
Scientific Name	Common Name	Wetland Status
VISCACEAE - Mistletoe Family		
Phoradendron serotinum ssp. *macrophyllum*[11]	bigleaf mistletoe	UPL
ZANNICHELLIACEAE - Horned-Pondweed Family		
Zannichellia palustris	horned-pondweed	OBL
ZYGOPHYLLACEAE - Caltrop Family		
*Tribulus terrestris**	punture vine	UPL

* Indicates introduced non-native species.

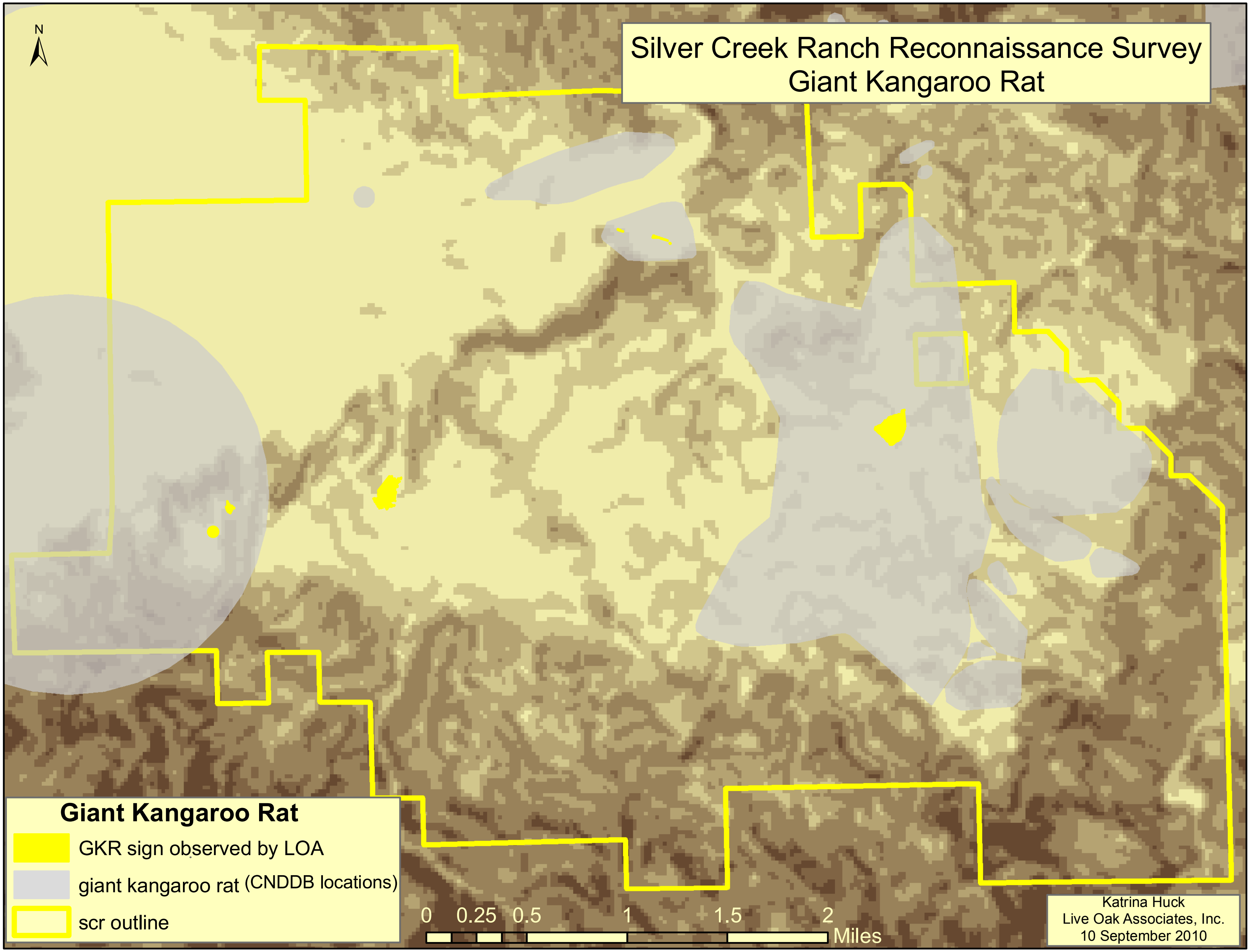
Key to the U.S. Fish and Wildlife wetland indicator status abreviations:

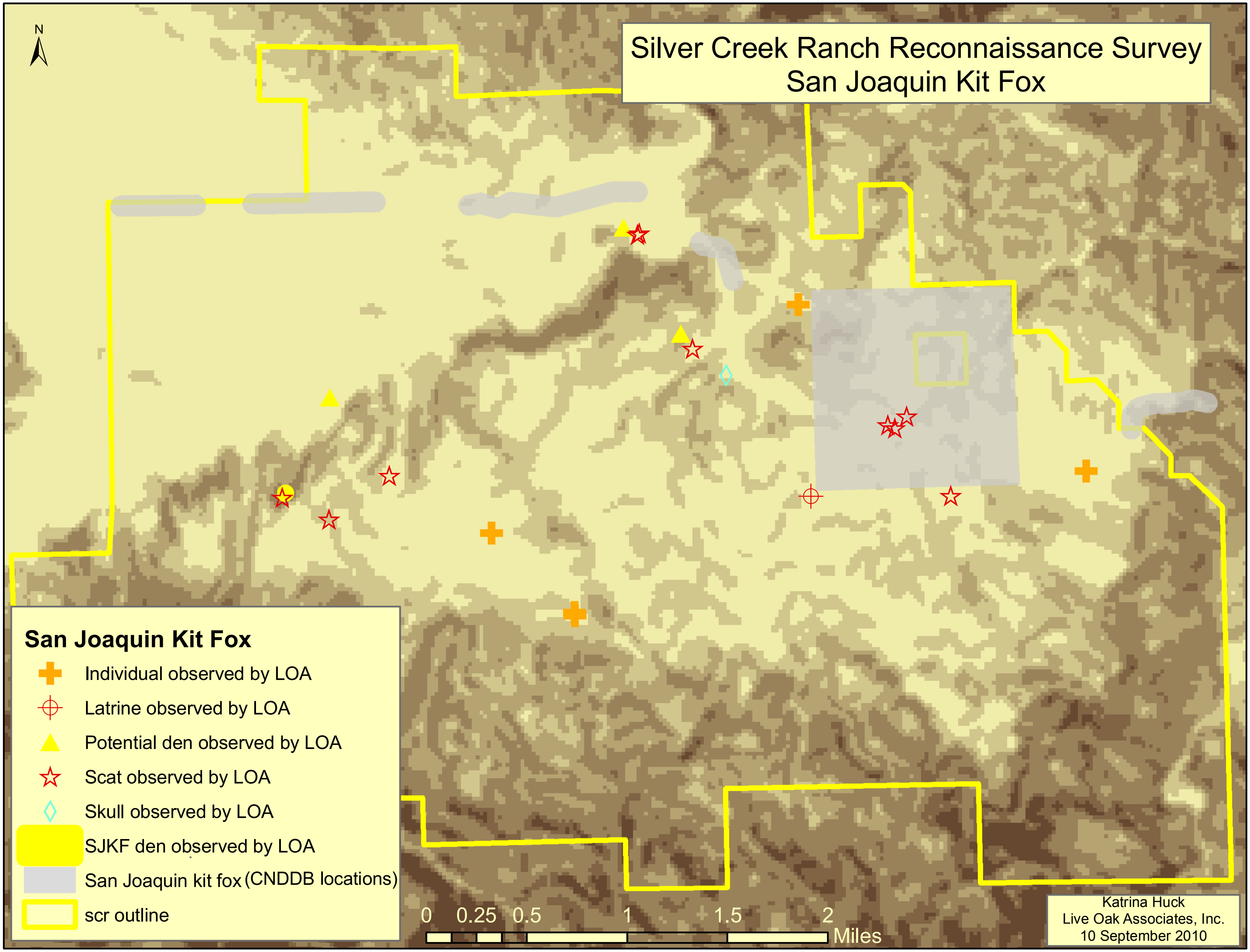
OBL - obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
+/- - indicates High or Low end of category.
NI - No investigation

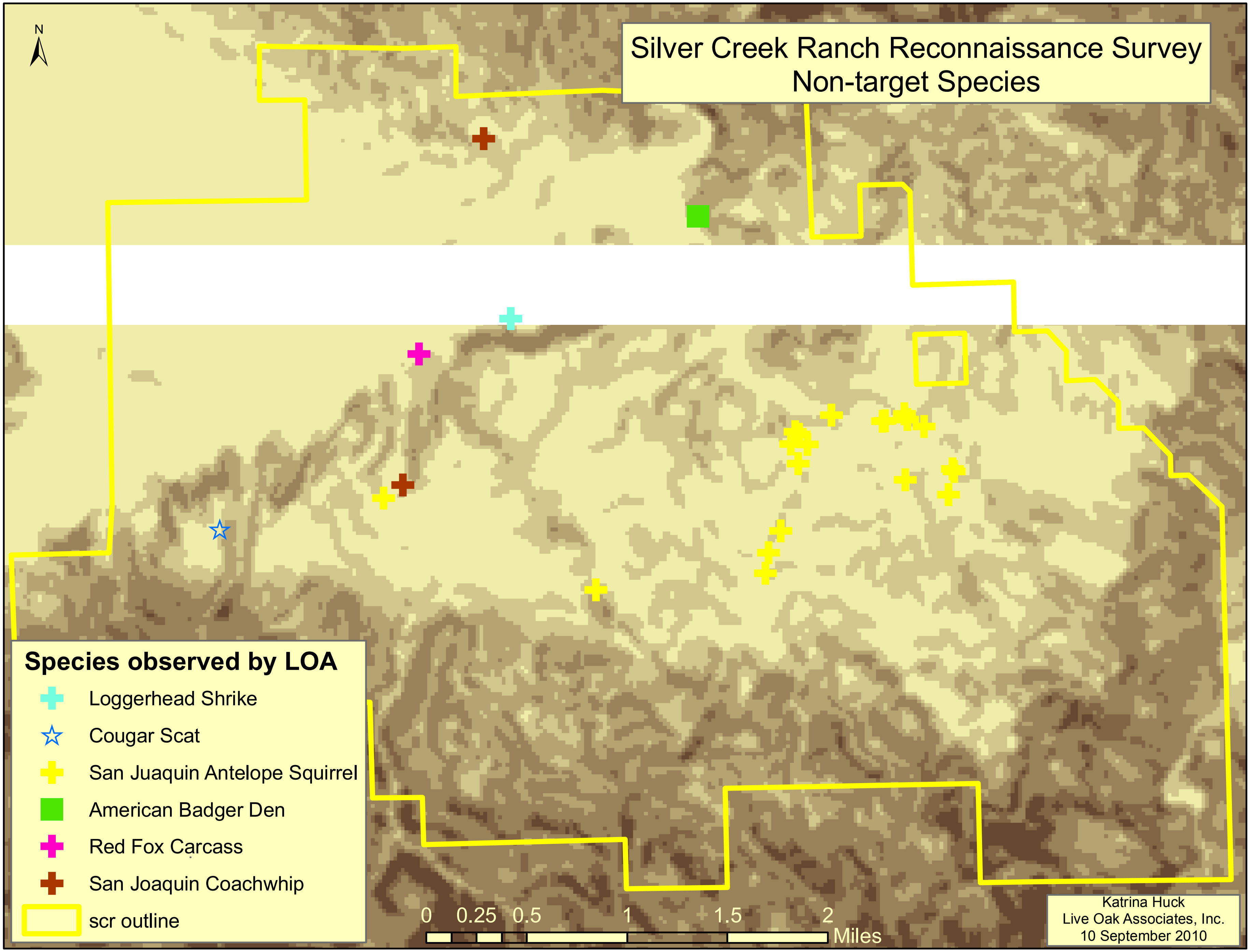
1 syn. *Yucca whipplei*
2 formerly included in family Liliaceae
3 syn. *Blepharizonia plumosa* ssp. *viscida*
4 syn. *Hemizonia kelloggii*
5 syn. *Lagophylla ramossissima* ssp. *ramosissima*
6 formerly included in family Hydrophyllaceae
7 syn. *Scirpus maritimus*
8 syn. *Scirpus americanus*
9 syn. *Scirpus pungens*
10 syn. *Eremocarpus setigerus*
11 syn. *Phoradendrom macrophyllum*

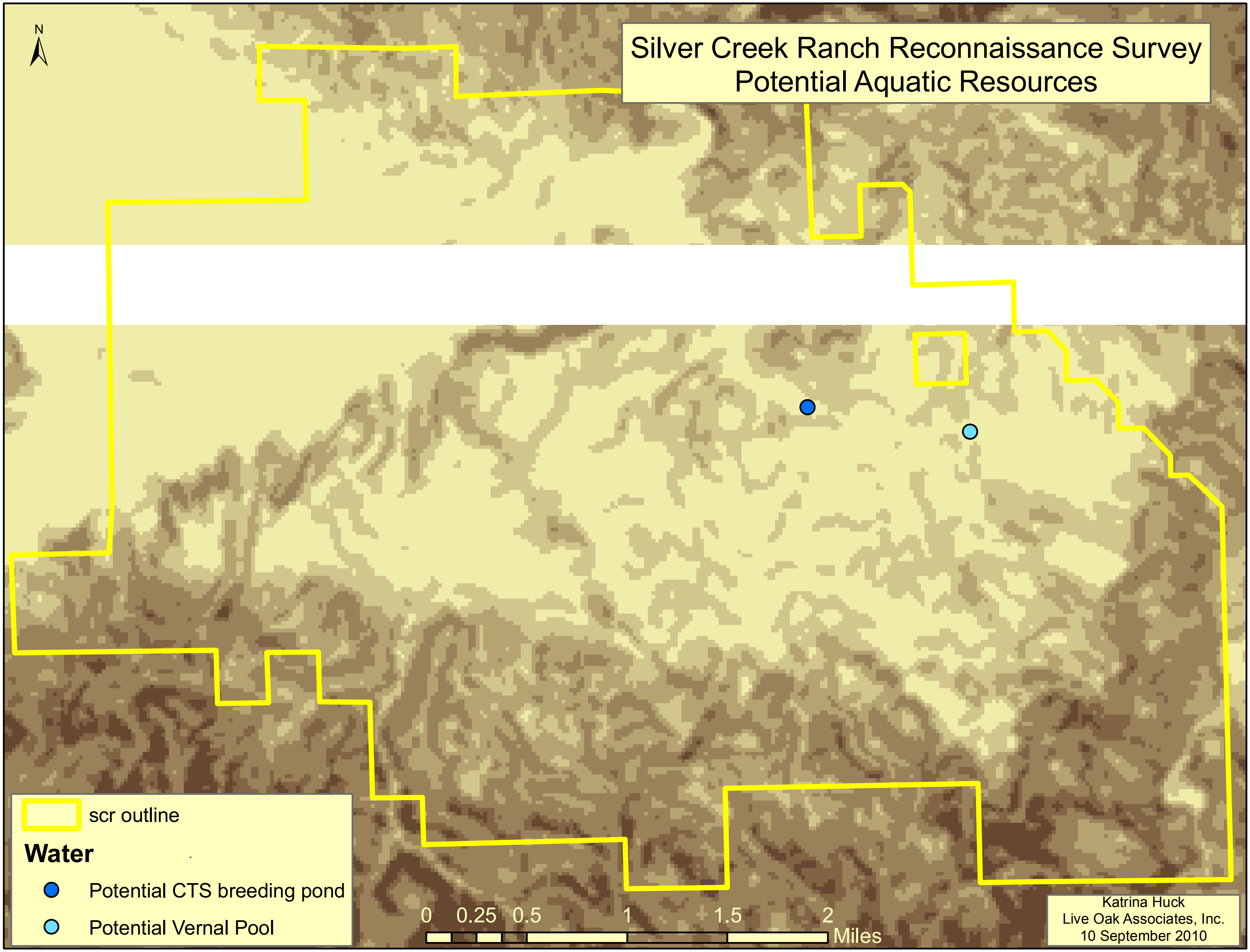


Silver Creek Ranch Reconnaissance Survey
Blunt-nosed Leopard Lizard
N
Blunt-nosed Leopard Lizard
Individual observed by LOA
blunt-nosed leopard lizard(CNDDB locations)
scr outline
0
0.25
0.5
1
1.5
2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


N
Silver Creek Ranch Reconnaissance Survey
Giant Kangaroo Rat
Giant Kangaroo Rat
GKR sign observed by LOA
giant kangaroo rat (CNDDB locations)
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


Silver Creek Ranch Reconnaissance Survey
San Joaquin Kit Fox
N
San Joaquin Kit Fox
Individual observed by LOA
Latrine observed by LOA
Potential den observed by LOA
Scat observed by LOA
Skull observed by LOA
SJKF den observed by LOA
San Joaquin kit fox (CNDDB locations)
scr outline
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


Silver Creek Ranch Reconnaissance Survey
Non-target Species
N
Species observed by LOA
Loggerhead Shrike
Cougar Scat
San Juaquin Antelope Squirrel
American Badger Den
Red Fox Carcass
San Joaquin Coachwhip
scr outline
0
0.25
0.5
1
1.5
2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010


Silver Creek Ranch Reconnaissance Survey
Potential Aquatic Resources
N
scr outline
Water
Potential CTS breeding pond
Potential Vernal Pool
0 0.25 0.5 1 1.5 2
Miles
Katrina Huck
Live Oak Associates, Inc.
10 September 2010

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office
Species Account
BLUNT-NOSED LEOPARD LIZARD
Gambelia sila

Blunt-Nosed Leopard Lizard
Adam Zerrenner, USFWS

CLASSIFICATION: Endangered
Federal Register 32:4001; March 11, 1967
http://ecos.fws.gov/docs/federal_register/fr18.pdf (PDF)
The blunt-nosed leopard lizard was listed as *Crotaphytus wislizenii silus*. In 1975, it was moved to the genus *Gambelia* as a full species, *Gambelia silus*. More recently, the *specific* name was changed to *sila* to match the gender of the genera name.

STATE LISTING STATUS: The blunt-nosed leopard lizard was listed as endangered by the State of California in 1971.

CRITICAL HABITAT: None designated

RECOVERY PLAN: Final
Recovery plan for the upland species of the San Joaquin Valley, California
http://ecos.fws.gov/docs/recovery_plan/980930a.pdf (PDF)

5-year review: Completed February 2010. No change was recommended.
http://www.fws.gov/ecos/ajax/docs/five_year_review/doc3209.pdf (1 MB)
September 30. 1998

DESCRIPTION:

The blunt-nosed leopard lizard (Gambelia silus) is a relatively large lizard the Iguanidae family. It has a long, regenerative tail, long, powerful hind limbs, and a short, blunt snout. Adult males are slightly larger than females, ranging in size from 3.4 to 4.7 inches in length, excluding tail. Females are 3.4 to 4.4 inches long. Males weigh 1.3 to 1.5 ounces, females 0.8 to 1.2.

Blunt-nosed leopard lizards feed primarily on insects (particularly grasshoppers, crickets and moths), other lizards and occasionally plant material.

Although blunt-nosed leopard lizards are darker than other leopard lizards, they exhibit tremendous variation in color and pattern on their backs. Their background color ranges from yellowish or light gray-brown to dark brown, depending on the surrounding soil color and vegetation. Their undersides are uniformly white. They have rows of dark spots across their backs, alternating with white, cream-colored or yellow bands. See the Recovery Plan for more details about identification.

Males are highly combative in establishing and maintaining territories. Male and female home ranges often overlap. The mean home range size varies from 0.25 to 2.7 acres for females and 0.52 to 4.2 acres for males. Density estimates range from 0.1 to 4.2 lizards per acre. Population densities in marginal habitat generally do not exceed 0.2 blunt-nosed leopard lizards per acre. There are no current overall population size estimates for the species.

Breeding activity begins within a month of emergence from dormancy and lasts from the end of April to the end of June. Male territories may overlap those of several females, and a given male may mate with several females. Two to six eggs are laid in June and July, and their numbers are correlated with the size of the female. Under adverse conditions, egg-laying may be delayed one or two months, or reproduction may not occur at all.

Females typically produce only one clutch of eggs per year. But some may produce three or more under favorable environmental conditions. After about two months of incubation, young hatch from late July through early August, rarely to September.

Seasonal above ground activity is correlated with weather conditions, primarily temperature. Lizards are most active on the surface when air temperatures are between 74° and 104° F, with surface soil temperatures between 72° and 97°. Smaller lizards and young have a wider activity range than the adults.

Leopard lizards use small rodent burrows for shelter from predators and temperature extremes. Burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels. Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. In areas of low mammal burrow density, lizards will construct shallow, simple tunnels in earth berms or under rocks.

Potential predators are numerous. They include snakes, predatory birds and most carnivorous valley mammals. Blunt-nosed leopard lizards themselves feed primarily on insects (mostly grasshoppers, crickets and moths) and other lizards.

DISTRIBUTION:

This species is found only in the San Joaquin Valley and adjacent foothills, as well as the Carrizo Plain and Cuyama Valley. It inhabits open, sparsely vegetated areas of low relief on the valley floor and the surrounding foothills. It also inhabits alkali playa and valley saltbush scrub. In general, it is absent from areas of steep slope, dense vegetation, or areas subject to seasonal flooding.

Although the boundaries of its original distribution are uncertain, the species probably ranged from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south, and from the Coast Range mountains, Carrizo Plain and Cuyama Valley in the west to the foothills of the Sierra Nevada in the east.

The currently occupied range consists of scattered parcels of undeveloped land on the Valley floor, most commonly annual grassland and valley sink scrub. See 5-year review (above) for details.

THREATS:

Habitat disturbance, destruction and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Stebbins first recognized, in 1954, that agricultural conversion of its habitat was causing the extirpation of the blunt-nosed leopard lizard.

Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. However, light or moderate grazing may be beneficial, unlike cultivation of row crops, which precludes use by leopard lizards.

Direct mortality occurs when animals are killed in their burrows during construction, killed by vehicle traffic, drowned in oil, or fall into excavated areas from which they are unable to escape. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization.

The use of pesticides may directly and indirectly affect blunt-nosed leopard lizards. The insecticide Malathion has been used since 1969 to control the beet leafhopper, and its use may reduce insect prey populations. Fumigants, such as methyl bromide, are used to control ground squirrels. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned. Visit the California Dept. of Pesticide Regulation Endangered Species Project web page for more information.

Cultivation, petroleum and mineral extraction, pesticide applications, off-road vehicle use, and construction of transportation, communication, and irrigation infrastructures collectively have caused the reduction, fragmentation of populations and decline of blunt-nosed leopard lizards.

REFERENCES FOR ADDITIONAL INFORMATION:

Montanucci, R.R. 1970. Analysis of hybridization between *Crotaphytus wislizenii* and *Crotaphytus silus* (Sauria: Iguanidae) in California. Copeia 1970:104-123.

Montanucci, R.R., R.W. Axtell, and H.C. Dessauer. 1975. Evolutionary divergence among collared lizards (*Crotphytus*), with comments on the status of *Gambelia*. Herpetologica 31:336-347.

Stebbins, R.C. 1954. Amphibians and reptiles of western North America. McGraw-Hill Book Co., Inc., NY.

Thelander, C. ed. 1994. Life on the edge: a guide to California's endangered natural resources. BioSystem Books. Santa Cruz, CA. p 272-273.

Photo Credit: Adam Zerrenner, U.S. Fish & Wildlife Service. Public domain.

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825
Phone (916) 414-6600
FAX (916) 414-6713

Last updated: May 28, 2010

Blunt-nosed leopard lizard
(*Gambelia sila*)

5-Year Review:
Summary and Evaluation

T. Kuhn, U.S. Fish and Wildlife Service 2009

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Sacramento, California
February 2010

5-YEAR REVIEW

Blunt-nosed leopard lizard
(*Gambelia sila*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. The blunt-nosed leopard lizard was listed as endangered under the Endangered Species Preservation Act in 1967, and was not subject to the current listing processes and, therefore, did not include an analysis of threats to the lizard. However, a review of Federal and State agency materials and scientific publications written at or near the time of listing indicates that listing was in fact based on the existence of threats that would be attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley of central California (Stejneger 1893; Smith 1946; Montanucci 1965, 1970; Tollestrup 1979a). This species typically inhabits open, sparsely vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills (Smith 1946; Montanucci 1965). Holland (1986) described the vegetative communities that blunt-nosed leopard lizards are most commonly found in as Nonnative Grassland and Valley Sink Scrub communities. Other suitable habitat types on the Valley floor for this species include Valley Needlegrass Grassland (Holland 1986), Alkali Playa (Holland 1986), and Atriplex Grassland (Tollestrup 1976).

The species is a relatively large lizard in the Iguanidae family with a long, regenerative tail; long, powerful hind limbs; and a short, blunt snout (Smith 1946; Stebbins 1985). Though their under surface is uniformly white, the species exhibits tremendous variation in color and pattern on the back (Tanner and Banta 1963; Montanucci 1965, 1970), ranging from yellowish or light gray-brown to dark brown. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches (Tollestrup 1982) and weigh between 0.8 and 1.5 ounces (Uptain *et al.* 1985). Blunt-nosed leopard lizards use small rodent burrows for shelter from predators and temperature extremes (Tollestrup 1979b). Burrows are usually abandoned ground squirrel

(*Spermophilus beecheyi*) tunnels, or occupied or abandoned kangaroo rat tunnels (*Dipodomys* spp.) (Montanucci 1965). Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. Montanucci (1965) found that in areas of low mammal burrow density, lizards would construct shallow, simple tunnels in earth berms or under rocks. Blunt-nosed leopard lizards feed primarily on insects (mostly grasshoppers, crickets, and moths) and other lizards, although some plant material is rarely eaten or, perhaps, unintentionally consumed with animal prey. They appear to feed opportunistically on animals, eating whatever is available in the size range they can overcome and swallow.

I.A. Methodology used to complete the review: This review was prepared by a staff biologist for the Sacramento Fish and Wildlife Office (Service). This review is based on the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980), the *Revised Blunt-Nosed Leopard Lizard Recovery Plan* (Service 1985), the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) (Service 1998), as well as published literature, agency reports, biological opinions, completed and draft Habitat Conservation Plans (HCPs), unpublished data, and interviews with species experts. No previous status reviews for this species have been conducted. Due to the lack of a threats analysis within the 1967 listing (32 **FR** 4001), this 5-year review contains updated information on the species' biology and threats, and an assessment of that information since the time that 1980 Recovery Plan was drafted. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes this available information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

I.B. Contacts

Lead Regional Office –Diane Elam, Deputy Division Chief for Listing, Recovery and Habitat Conservation Planning, Region 8, Pacific Southwest Regional Office, (916) 414-6464

Lead Field Office – Kirsten Tarp, Recovery Branch, Sacramento Fish and Wildlife Office, Region 8, (916) 414-6600

Cooperating Field Office: Mike McCrary, Ventura Fish and Wildlife Office, Region 8, (805) 644-1766

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: 71 **FR** 16584, April 3, 2006. We did not receive any information in response to our request for information.

I.C.2. Listing history

Original Listing
FR notice: 32 **FR** 4001
Date listed: March 11, 1967*
Entity listed: Species – Blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*)
Classification: Endangered
***Note**: Listing documents at this time did not use the 5 factor analysis method, and did not provide discussion of status and threats.

I.C.3. Species' Recovery Priority Number at start of review: 2C

The Recovery Priority Number for the blunt-nosed leopard lizard is 2C. This Number reflects a high degree of threat, a high recovery potential, and a taxonomic rank of full species (Service 1983). The "C" indicates conflict with construction or other development projects or other forms of economic activity. This determination results from continued degradation and fragmentation of its habitat, perceived and realized threats to extant populations, and the potential for recovery of the species.

I.C.4. Recovery Plan or Outline

Name of plan:	Recovery Plan for Upland Species of the San Joaquin Valley, California
Date issued:	September 30, 1998
Dates of Previous Revisions:	Recovery Plan Blunt-Nosed Leopard Lizard (Service 1980), and Revised Blunt-Nosed Leopard Lizard Recovery Plan (Service 1985)

II. REVIEW ANALYSIS

II.A. Application of the 1996 Distinct Population Segment (DPS) policy

II.A.1. Is the species under review listed as a DPS?

____ ***Yes***
__X_ ***No***

II.A.2. Is there relevant new information for this species regarding the application of the DPS policy?

____ ***Yes***
__X_ ***No***

II.B. Recovery Criteria

II.B.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Yes***
_____ ***No***

II.B.2. Adequacy of recovery criteria.

II.B.2.a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

__X_ ***Yes***
_____ ***No***

II.B.2.b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

_____ ***Yes***
__X__ **No**

II.B.3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors[*] are addressed by that criterion.

The downlisting and delisting criteria for the blunt-nosed leopard lizard in the Recovery Plan are described below. Listing Factor B is not considered relevant to this species.

<u>*Downlisting Criteria*</u>
Reclassification to threatened status should be evaluated when the species is protected in specified recovery areas from incompatible uses, management plans have been approved and implemented for recovery areas that include survival of the species as an objective, and population monitoring indicates that the species is stable. Downlisting criteria include:

1) *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, including one each on (addresses Listing Factor A):*
    A) *Valley floor in Merced or Madera Counties;*
    B) *Valley floor in Tulare or Kern Counties;*
    C) *Foothills of the Ciervo-Panoche Natural Area;*

A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Overutilization for commercial, recreational, scientific, or educational purposes;
C) Disease or predation;
D) Inadequacy of existing regulatory mechanisms;
E) Other natural or manmade factors affecting its continued existence.

D) Foothills of western Kern County; and
E) Foothills of the Carrizo Plain Natural Area.

2) *Management Plan approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective (addresses Listing Factor C and E).*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards 1 per acre through one precipitation cycle (addresses Listing Factor E).*

A brief discussion of each downlisting criterion for the blunt-nosed leopard lizard is presented in the text below, and further abbreviated in Table 1. Appendix A presents detailed information used for analysis of these downlisting criteria in this review, including the level of protection for each of the recovery areas, land management plan status for these areas, and the mean density and stability of blunt-nosed leopard lizard populations. Figures 1 and 2 illustrate the location of known blunt-nosed leopard lizard occurrences reported in the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) (CNDDB 2006) and the location of large preserves within the range of the blunt-nosed leopard lizard.

1. *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, as follows:*

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each of about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 to 640-acre parcels. Within the Ciervo-Panoche Natural Area, two Areas of Critical Environmental Concern (ACEC), separated by 2 miles, protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. The ACEC designation is the highest level of protection that the BLM (under Federal Lands Policy and Management Act) can assign to an area; with this designation, the BLM is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, including fish and wildlife resources. Within the foothills of western Kern County, the Occidental Petroleum Ltd. (Oxy), conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area, but not in the four other specified recovery areas.

Notably, through the development of a draft HCP for Chevron USA, Inc. (Chevron), lands in the *Lokern Natural Area*, and a draft HCP for Oxy of Elk Hills lands in the *Foothills of western Kern County*, the downlisting criterion is expected to also be met for these two areas in the foreseeable future. The draft Chevron Lokern HCP (G. Scott, Chevron, pers. comm. 2006) proposes to protect an additional 11,143 acres in the Lokern area. Thus, in total, approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. Similarly, the Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) proposes to preserve roughly 38,780 acres of the Naval Petroleum Reserve-1 (NPR-1). Nonetheless, for the purposes of this review, until these HCPs are completed and an incidental take permit for the proposed activities is issued, the habitat protection associated with the proposed HCP remains uncertain.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern National Wildlife Refuge (NWR); Pixley NWR; the Center for Natural Lands Management (CNLM) lands at Semitropic Ridge Preserve; the CNLM, Plains Exploration & Production Company (PXP), and Bureau of Land Management (BLM) lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM, the Nature Conservancy, and CDFG lands of the Carrizo Plain National Monument; the Coles Levee Ecological Preserve (CLEP); and Kern Water Bank (KWB) Conservation Lands. Whereas, management plans have not been developed for the remaining specified protected areas including: Merced and/or Madera Counties; CDFG lands on the *Semitropic Ridge Preserve;* CDFG and Oxy Lands (outside of the Elk Hills Conservation Area) on the Lokern Natural area; Ciervo-Panoche Natural Area; and, NPR-2. Notably, the management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion for the approval and implementation of management plans in all protected areas is partly achieved.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*[1]

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004; Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005; Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley National Wildlife Refuge (NWR; Williams *in litt.* 2006), Buttonwillow Ecological Reserve (ER), Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). Long-term population studies have not been conducted for blunt-nosed leopard lizards in the Cuyama Valley, the Ciervo-Panoche Natural Area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

[1] A precipitation cycle is defined in the Recovery Plan as a period when annual rainfall includes average to 35 percent above-average through greater than 35 percent below-average and back to average or greater.

Table 1. Summary display of each protected area specified in the Recovery Plan for the blunt-nosed leopard lizard and downlisting criteria.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Merced or Madera		Not Achieved (0 acres protected)	Not Achieved	Not Achieved	Large preserves have been designated in western Merced County (e.g. Grasslands Ecological Area, ~179,000 acres) but are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.* 2006)
	Kern and Tulare	*Semitropic Ridge Preserve*	Not Achieved (5,278 contiguous acres protected--3,093 acres CNLM; 2,185 acres CDFG)	Achieved on CNLM lands; Not Achieved on CDFG Lands	Not Achieved	Though only slightly less than the specified 5,997 acres of contiguous habitat, only about 1,500 acres of the area support 2 or more lizards per acre (Warrick *in litt.* 2006).
	Kern	*Kern National Wildlife Refuge*	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	The majority this area is seasonally flooded, allowing for only roughly 2,000 acres of potential blunt-nosed leopard lizard habitat. No confirmed sightings of lizard have been reported in this area since 1996 (Williams *in litt.* 2006).
	Kern	*Lokern Natural Area*	Not Achieved (13,160 acres of highly fragmented land protected--includes 3,858 acres BLM, 3,332 acres CNLM, 968 acres CDFG, 840 acres Plains Exploration and Production (PXP), and 4,162 acres Occidental of Elk Hills (OXY)	Achieved on BLM, CNLM and PXP lands; Not Achieved on CDFG and Oxy Lands (outside of the Elk Hills Conservation Area)	Not Achieved	The largest contiguous block of habitat is ~2,882 acres. The draft Chevron Lokern HCP (Chevron, *in prep.* 2008) would protect an additional 11,143 acres, and result in ~24,303 acres of protected contiguous habitat in the area, if finalized.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Kern	*Buttonwillow Ecological Reserve*	Not Achieved (1,350 contiguous acres protected)	Achieved	Not Achieved[1]	This area contains one of the largest and most stable populations on the Valley Floor (Selmon *in litt.* 2006).
	Kern	*CLEP, KWB Conservation Lands, Tule Elk State Reserve*	Not Achieved (11,291 acres protected--6,059-acre CLEP, 4,263-acre KWB Conservation Lands, and 969-acre Tule Elk State Reserve)	Achieved	Not Achieved	Although these Preserves are sizeable, habitat contiguity is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119
	Tulare	*Pixley National Wildlife Refuge*	Not Achieved (6,833 fragmented acres of protected land--principally comprised of 3 large blocks: 4,445, 1,476, and 800 acres)	Achieved	Not Achieved	
	Kern and Tulare	*Allensworth Ecological Reserve*	Not Achieved (5,243 fragmented acres of protected land--principally comprised of 4 large blocks: 2,482, 1,432, 551, and 536 acres.	Achieved	Not Achieved	Blunt-nosed leopard lizard population in this area has declined over the past 15 years (Selmon *in litt.* 2006); no updated data is available.

Table 1 continued.

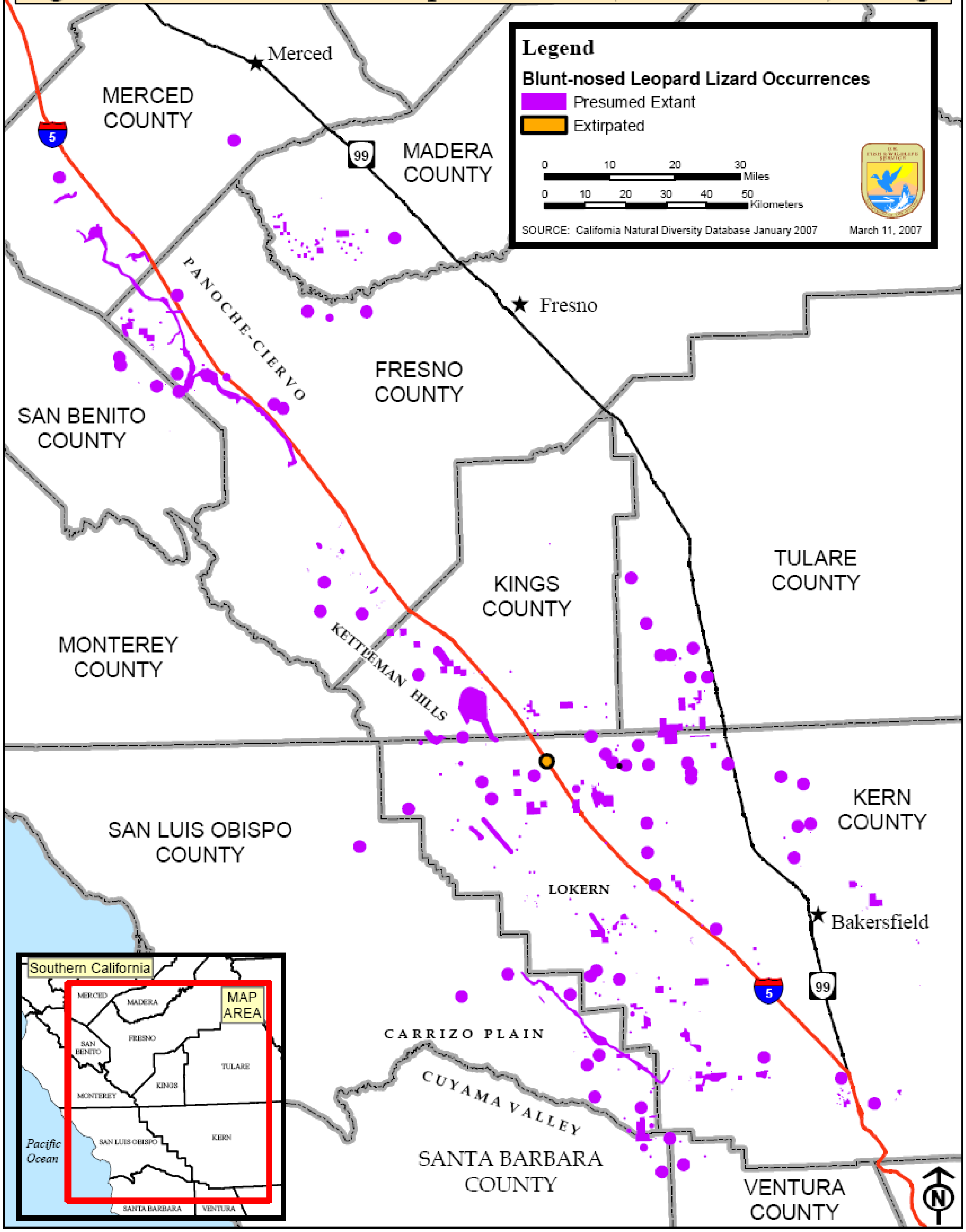
Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Benito and Fresno	Ciervo-Panoche Natural Area	Not Achieved (16,600 fragmented acres--the largest contiguous block is roughly 4,800 acres)	Not Achieved	Not Achieved	Much of this area is not suitable habitat due to dense vegetation and high clay soils (Lowe *in litt.* 2006; L. Saslaw, pers. comm. 2006); rather the remaining portions have been noted as some of the best habitat in the Region. However, most prime habitat remains unprotected on private lands. Only 3 of the 21 reported occurrences are within BLM ACEC (CNDDB 2006; Lowe *in litt.* 2006).
	Kern	*Elk Hills Conservation Area*	Not Achieved (7,932 fragmented acres--largest contiguous parcel is roughly 3,770 acres)	Achieved	Not Achieved	The Oxy Elk Hills HCP is in draft form; barring any substantive changes before completion, the HCP is expected to result in the preservation of roughly 38,780 acres of Elk Hills NPR-1 (Live Oak & Associates, *in litt.* 2009).
	Kern	*NPR-2*	Not Achieved (9,000 highly fragmented acres within NPR-2 and the adjacent Buena Vista Valley)	Not Achieved	Not Achieved	The Caliente Resource Management Plan is scheduled to be revised to include BLM lands within NPR-2.
	Kern	*Wind Wolves Preserve*	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	Blunt-nosed leopard lizards have not been observed at the site since the early 1990s.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Luis Obispo	Carrizo Plain Natural Area	Achieved (~250,000 largely contiguous acres protected within the BLM National Monument and adjacent CDFG Ecological Reserve, and the Upper Cuyama Valley (Saslaw *in litt.* 2006).	Achieved	Not Achieved for Carrizo Plain Natural Area	The Resource Management Plan for these areas is currently being revised the BLM; though conserving listed species and habitat will continue to be a primary focus of the revisions.

NOTES: [1]Quantified population density estimates are not currently available for Buttonwillow ER due to a lack of surveys.

Figure 1. Blunt-Nosed Leopard Lizard *(Gambelia sila)* Range



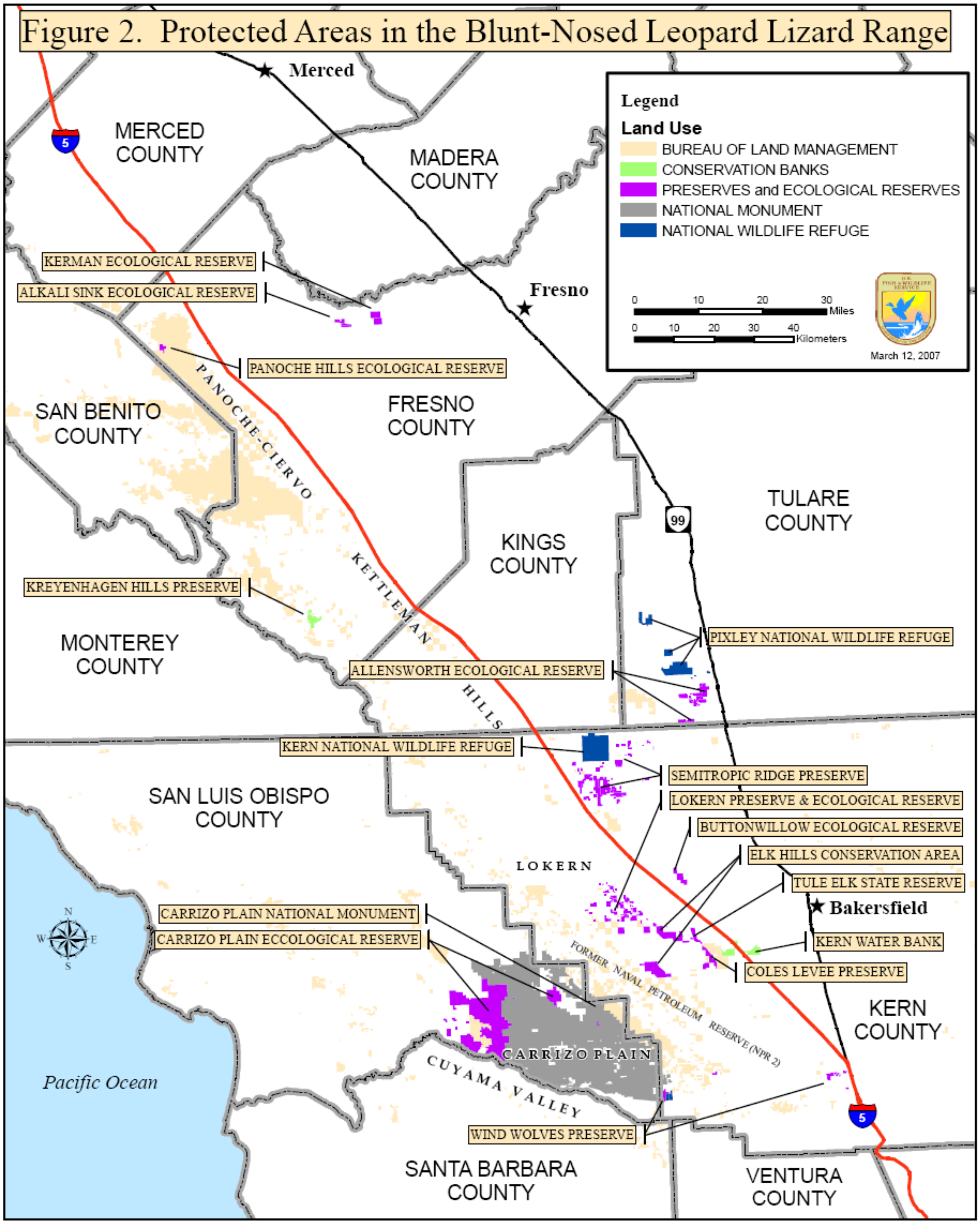


Figure 2. Protected Areas in the Blunt-Nosed Leopard Lizard Range
Legend
Land Use
BUREAU OF LAND MANAGEMENT
CONSERVATION BANKS
PRESERVES and ECOLOGICAL RESERVES
NATIONAL MONUMENT
NATIONAL WILDLIFE REFUGE
0 10 20 30 Miles
0 10 20 30 40 Kilometers
March 12, 2007
Merced
MERCED COUNTY
MADERA COUNTY
Fresno
FRESNO COUNTY
SAN BENITO COUNTY
KINGS COUNTY
TULARE COUNTY
MONTEREY COUNTY
SAN LUIS OBISPO COUNTY
KERN COUNTY
SANTA BARBARA COUNTY
VENTURA COUNTY
Pacific Ocean
Bakersfield
KERMAN ECOLOGICAL RESERVE
ALKALI SINK ECOLOGICAL RESERVE
PANOCHE HILLS ECOLOGICAL RESERVE
PANOCHE-CIERVO
KETTLEMAN HILLS
KREYENHAGEN HILLS PRESERVE
PIXLEY NATIONAL WILDLIFE REFUGE
ALLENSWORTH ECOLOGICAL RESERVE
KERN NATIONAL WILDLIFE REFUGE
SEMITROPIC RIDGE PRESERVE
LOKERN PRESERVE & ECOLOGICAL RESERVE
BUTTONWILLOW ECOLOGICAL RESERVE
ELK HILLS CONSERVATION AREA
TULE ELK STATE RESERVE
KERN WATER BANK
COLES LEVEE PRESERVE
LOKERN
CARRIZO PLAIN NATIONAL MONUMENT
CARRIZO PLAIN ECCOLOGICAL RESERVE
FORMER NAVAL PETROLEUM RESERVE (NPR 2)
CARRIZO PLAIN
CUYAMA VALLEY
WIND WOLVES PRESERVE
5
99

Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR, while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. Elkhorn Plain, however, has been reported to have the highest abundance and density of blunt-nosed leopard lizards recorded in any area with densities up to 16 adults per hectare and 35.6 hatchlings per hectare (Germano and Williams 2005). Therefore, the downlisting criterion for population stability has not been achieved for any of the specified protected areas in the Recovery Plan.

Delisting Criteria

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

1) *Three additional areas with about 5,997 acres or more of contiguous, occupied habitat including:*
    - A) *One on the Valley floor;*
    - B) *One along the western Valley edge in Kings or Fresno Counties; and*
    - C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.*
2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Summary of Recovery Criteria

Due to the lack of protection of sufficient habitat in specified recovery areas, the lack of approval and implementation of management plans, and the lack of population stability, the downlisting criteria for blunt-nosed leopard lizard have not been met. Therefore, the delisting criteria for blunt-nosed leopard lizard have also not been met. The acreage of contiguous blunt-nosed leopard lizard habitat protected, adequacy of management plans, and population trends are discussed below for each of the recovery areas specified in the delisting criteria. None of the delisting recovery criteria for protection of habitat, approval and implementation of management plans (except for the Kettleman Hills ACEC), and population stability have been achieved for the specified areas: western Valley edge in Fresno or Kings Counties, Upper Cuyama Valley, and other Valley floor areas. Appendix A includes detailed information used for the analysis of the delisting criteria.

II.C. Updated Information and Current Species Status

Note this section typically includes updated information on species status since the time of listing. However, given the brevity of information included within the 1967 listing rule (Service 1967), and that no previous status reviews for this species have been conducted, the following update presents new information since the issuance of the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980).

II.C.1. Biology and Habitat

II.C.1.a. Abundance, population trends, spatial distribution, and biology

Abundance and Population Trend Surveys

Long-term localized population census and plot-based research studies have been conducted in areas on the Valley Floor (Pixley NWR and Lokern Natural Area) and Foothill Regions (Elk Hills Conservation Area, and Elkhorn Plain) in the southern Valley (see Table 2). As these surveys were conducted to achieve various goals and according to different methods, and given that they represent only a small proportion of the species range, they are not directly comparable. However, they provide some insight to abundance and population trends of this species in specific locations.

Long-term studies show blunt-nosed leopard lizard population instability, especially during years of above average precipitation (Germano *et al.* 2004; Germano *et al.* 2005; Germano and Williams 2005; Germano *in litt.* 2006; Williams *in litt.* 2006). The largest and most stable population of blunt-nosed leopard lizards on the Valley Floor is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 for unknown reasons. Establishing corridors between existing natural areas on the Valley floor in Tulare and Kern Counties will be important for maintaining these populations (especially at the smaller Buttonwillow ER). Relocation of blunt-nosed leopard lizards to some areas such as Allensworth ER (where numbers have plummeted in the past 15 years) will also be necessary for persistence of the population (Selmon *in litt.* 2006). Based on population instability and on-going modification and conversion of existing habitat to agriculture, residential or commercial developments, and for petroleum and mineral extraction activities, overall species abundance is considered to be decreasing across its range.

Table 2. Blunt-nosed leopard lizard survey results for Valley Floor and Foothill Protection Areas; note the surveyed areas account for only a small portion of the species range.

County	Survey Location	Duration of Study	Survey Results (interannual trends)	Comments	Source
Valley Floor					
Tulare	Pixley NWR	1993-2006	Decline	Population fluctuations seemed to be negatively correlated with annual precipitation	Williams *in litt.* 2006
Kern	Lokern Natural Area	1997-2005	Variable	Methods included ten-day census surveys of four grazed and four non-grazed plots; more individuals observed in grazed plots than ungrazed in all but one year	Germano *et al.* 2005
Foothill					
Kern	Elk Hills Conservation Area (Oxy conservation lands--North Flank of the Elk Hills, and Buena Vista Valley)	2000-2005	Increase	Combined road and foot surveys	Quad Knopf 2006
Kern	Elkhorn Plain	1988-2003	Variable	One grazed and one non-grazed plot	Williams *et al.* 1993; Germano and Williams 2005

Spatial Distribution (Current Range)

Historically, blunt-nosed leopard lizards occurred in arid lands throughout much of the San Joaquin Valley and adjacent foothills, ranging from San Joaquin County in the north, to the Tehachapi Mountains in the south, as well as in the Carrizo Plain and Cuyama Valley (Montanucci 1965; Germano and Williams 1992a; McGuire 1996). At the time of listing, the blunt-nosed leopard lizard was found in scattered locations in San Joaquin Valley, in the foothills of Tulare and Kern Counties and up the eastern portions of the Coast Range foothills; Fresno, Kern, Madera, Merced, San Luis Obispo and Tulare Counties (Stebbins 1954, and California Department of Fish and Game 1972 as reported in BLM 1972). Due to widespread agricultural development of natural habitat in the San Joaquin Valley, the current distribution of blunt-nosed leopard lizards is restricted to less than 15 percent of its historic range (Germano and Williams

1992a; Jennings 1995). In the remaining habitat that exists, blunt-nosed leopard lizards occur in alkali sink scrub, saltbush scrub, as well as native and nonnative grasslands on the Valley floor and in the surrounding foothills areas (Montanucci 1965; Germano *et al.* 2001; Stebbins 2003).

Although the blunt-nosed leopard lizard has been listed as endangered for nearly 40 years, there has never been a comprehensive survey of the species entire historical range; thus, any changes in the range of the species from the time of listing are currently unknown. It has been reported that the contemporary range of blunt-nosed leopard lizards was confined to a few areas scattered from southern Merced County to southern Kern County, between elevations of 100-2,400 feet (Tollestrup 1979a). However, as reported in the Recovery Plan (Service 1998), blunt-nosed leopard lizards have been found near Firebaugh and Madera (Williams 1990), Ciervo, Tumey, Panoche Hills, Anticline Ridge, Pleasant Valley, Lone Tree, Sandy Mush Road, Whimesbridge, Horse Pasture, and Kettleman Hills Essential Habitat Areas (CDFG 1985). Also, as recently as May 2009, the Endangered Species Recovery Program (ESRP) of California State University, Stanislaus, reported that blunt-nosed leopard lizards had been observed on the Madera Ranch in western Madera County from surveys conducted for the Madera Irrigation District (Kelly *et al*. 2009).

Biology

Microhabitat use and home range characteristics of blunt-nosed leopard lizards were compared at two sites near Elk Hills in Buena Vista Valley that differed in ground cover (Warrick *et al*. 1998). These authors reported that blunt-nosed leopard lizard microhabitat use differed significantly between the two study sites. At the more densely vegetated site, blunt-nosed leopard lizards used dry wash areas significantly more than grassland, floodplain, and road habitats. Conversely, at the more sparsely vegetated site, grassland was used more than wash habitat, and hills were used less than all other habitats.

Warrick *et al.* (1998) also compared home range size, core area size, and amount of overlap of ranges between the sites. The average male home range size was 10.48 acres, and the average female home range size was 4.99 acres. Female home ranges and core areas were overlapped extensively by male ranges at an average of 79.8 percent and 50.3 percent, respectively. Female home ranges were found to overlap the ranges of up to four other males, but were not observed to overlap with other females.

The span of seasonal activity for both adults and hatchlings described in the Recovery Plan Results was corroborated by results of a two-plot study on the Elkhorn Plain (Germano and Williams 2005). This study further postulated that activity levels can be strongly affected by environmental factors—temperature, precipitation and vegetation characteristics. These factors affect lizard behavior by effecting thermoregulation, metabolism, prey densities, and predatory success or mobility. For example, these authors reported that activity was completely absent for 21 months from July 1989 until April 1991 when individuals remained below ground due to dry conditions. In spite of this anomaly, Germano *et al.* (2004) supported the capacity of a 10-day survey to detect the blunt-nosed leopard lizard presence during typical environmental conditions compared to full-season surveys ($r^2 = 0.96$ for adults, $r^2 = 0.99$ for hatchlings/juveniles). Notably CDFG’s standardized protocol survey methods (CDFG 2004) require a minimum of 12 days of surveys to assess presence/absence for new ground disturbance during specific ambient air and ground temperature conditions.

Germano and Williams (2005) also compared data from the Elkhorn Plain study to data previously collected in Valley floor habitat and noted the following differences in behavior among the two regions. On the Elkhorn Plain, females were generally gravid by late April or early May, while some females were found with eggs in early July. Clutch size on the Elkhorn Plain ranged from 1 to 6 eggs, with a mean clutch size of 3.4 eggs (varying from 3.1 to 3.8 yearly). Many females produced multiple clutches in a year with up to four clutches observed in a single female. On Valley floor sites, clutch size ranged from 2 to 5 eggs with a mean of 2.9 to 3.3 eggs per clutch, and only a few females produced a second clutch (Montanucci 1967; Tollestrup 1982). The greater clutch size and greater frequency of multiple clutches observed on the Elkhorn Plain compared to the Valley floor was attributed to greater prey abundance with the irruptive population growth of grasshoppers in 1992 (Germano and Williams 2005).

II.C.1.b. Genetics, genetic variation, or trends in genetic variation

Gambelia sila and *G. wislizenii* from the San Joaquin Valley and Mojave Desert, respectively, hybridize in the upper Cuyama Valley near the Santa Barbara – San Luis Obispo County line (Montanucci 1978; Slack 2002). The greatest heterogeneity in color pattern and morphology is concentrated near Ballinger Canyon, with most of the *sila*-like lizards occurring to the north and *wislizenii*-like lizards to the south. The leopard lizard hybrid zone covers about 200 acres in Los Padres National Forest and is associated with an ecotone between *Stipa-Atriplex* grasslands and *Pinus-Juniperus-Artemisia* Great Basin shrub desert (Slack 2002). Most evidence shows that natural selection is opposing the production of hybrids between the two forms of leopard lizards. The intermediate phenotypes have a lower fitness than those approaching the parental species (Montanucci 1978). The hybridization likely began 20,000 years ago when the ranges of the two species overlapped in the vicinity of Ballinger Canyon. Climatic changes since then have resulted in the isolation of the hybrid population (Montanucci 1979). Thus, though not currently protected, the hybrid population is at risk of extinction due to the degradation of its habitat by heavy off-road vehicle (ORV) use, the conversion of 95 percent of its habitat into alfalfa fields, and the construction of roads and oil development activities (Montagne 1979; Slack 2002; Stafford *in litt.* 2006).

II.C.1.c. Taxonomic classification or changes in nomenclature

The blunt-nosed leopard lizard was federally listed in 1967 as *Crotaphytus wislizenii silus* (Service 1967). At the time of listing (Service 1967), this species was named *Crotaphytus silus*, according to Stejneger (1890) first description and nomenclature of the species. However, the precise taxonomic split between the collared and leopard lizard remained largely in debate until Montanucci (1970) argued for specific status based upon the study of hybrids between the long-nosed and blunt-nosed leopard lizards. The taxonomic debate was resolved when Montanucci (1970) separated the genera *Gambelia* from *Crotaphytus*, resulting in the generic epithet name *Gambelia silus* for the blunt-nosed leopard lizard. Montanucci *et al.* (1975) separated all leopard lizards from collared lizards, placing both *silus* and *wislizenii* into the genus *Gambelia* at full species status. Most recently, the specific spelling was changed to *sila* such that its gender agreed with the genera name *Gambelia* (Frost and Collins 1988; Collins 1990; Germano and Williams 1992b).

II.C.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act. The final ruling to list the blunt-nosed leopard lizard as endangered did not include a discussion of the threats to the lizard. The Service is using reports from the California Department of Fish and Game (Laughrin 1970; Morrell 1972, 1975), and the 1980 *Recovery plan for the blunt-nosed leopard lizard* to address threats that affected the lizard at the time of its listing.

II.C.2.a. Factor A, Present or threatened destruction, modification or curtailment of its habitat or range

This section summarizes the threats included under Factor A, and also covers the conservation efforts implemented to reduce threats over the known range of the blunt-nosed leopard lizard. At the time that the blunt-nosed leopard lizard was listed, the conversion of native habitat to agriculture was considered to be the primary threat to species. Additional threats to the blunt-nosed leopard lizard included habitat fragmentation, mineral development (primarily for oil and gas extraction), inappropriate grazing levels, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965).

Past research on this species reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizards (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Since listing, the Service has identified additional potential threats to the blunt-nosed leopard lizard including: landscape leveling and cultivation which caused habitat disturbance, destruction and fragmentation; grazing (under- or over-grazing); mineral development, primarily oil and gas extraction; and, agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965). The 1998 Recovery Plan added mortality from vehicle-strikes with roadway traffic and/or ORV (discussed in Factor E) to the threat list.

The loss and modification of habitat due to agricultural conversion and urban development remain the largest threat to the blunt-nosed leopard lizard. Mineral exploration and extraction, and water banking activities also affect a significant portion of the blunt-nosed leopard lizards range. More recently the proposed siting of solar facilities in blunt-nosed leopard lizard habitat is an emerging threat that has the potential to substantially affect blunt-nosed leopard lizard. Specific information of these on-going and recent threats and habitat conservation activities are described in detail below.

Collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Land conversions contribute to declines in blunt-nosed leopard lizard abundance directly and indirectly by increasing mortalities from sources including: displacement and habitat fragmentation, reducing feeding, breeding, and sheltering sites, and by reducing the carrying capacity and prey populations for occupied sites.

Dramatic loss of blunt-nosed leopard lizard habitat has continued to occur since the drafting of the 1980 Recovery Plan. According to Service files and a preliminary assessment of issued biological opinions from 1987 to 2006, roughly 120 projects permitted incidental take of blunt-nosed leopard lizard. In total, these projects allowed for the incidental take of approximately 220 individuals and roughly 21,200 acres of impacts to blunt-nosed leopard lizard habitat. Of these activities, the habitat disturbance was authorized for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB operations 6,000 acres permanent), and other agricultural, residential, and commercial development activities (covered under the Metropolitan Bakersfield HCP 15,200 acres permanent).

Note, these figures account for only those projects that were reviewed under the Act; the estimations do not include any loss of habitat or adverse effects from habitat conversion that was not reported to the Service. Presently, additional habitat loss can be expected due to on-going modification and conversion of existing habitat for agriculture, residential or commercial developments, oil and gas exploration activities, the construction of water banking facilities, and solar power developments.

Habitat Threats from Agriculture and Urban Development

Conversion of land for agricultural purposes continues to be the most critical threat to the blunt-nosed leopard lizard. Although the increment of habitat loss attributable to urban development appears to be increasing, this activity remains less significant than agriculture for this species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it common for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

Conversion of natural lands to agriculture has continued since the listing of the blunt-nosed leopard lizard. The 1980 Recovery Plan reported that between 1976 and 1979, habitat loss for the blunt-nosed leopard lizard was occurring at a rate of approximately 19,200 acres per year (Service 1980). By 1979, roughly 95 percent (approximately 8.1 million acres out of a total 8.5 million acres) of habitat on the San Joaquin Valley floor had been converted or otherwise destroyed (Service 1980; Williams 1985). The California Department of Water Resources has predicted continued loss of wildland habitat to agricultural conversion at a rate of 10,000 to 30,000 acres per year. The California Department of Forestry (1988) predicted wildland habitat losses totaling 465,000 acres in the San Joaquin Valley region between 1980 and 2010 as a result of agricultural conversion and urbanization. Much of the projected loss is likely to occur in the remaining blocks of habitat for listed and proposed species, where conversion also isolates populations by increasing habitat fragmentation, and limits availability of suitable habitat for future recovery of the species

The conversion of blunt-nosed leopard lizard habitat into agricultural fields continues to be a threat to blunt-nosed leopard lizard on private lands on the Valley floor. For example, in August 2006, about 1,300 acres of saltbush scrub and sink scrub habitat were illegally disced for cultivation of melons on the Valley floor along Interstate 5 north of the Kings – Kern County line. Blunt-nosed leopard lizards occur in several locations a few miles from the site (Vance *in litt.* 2006). Another similar instance of illegal discing of saltbush habitat was reported on the Valley floor in Kern County (Krise *in litt.* 2006).

The Panoche Valley was identified an important area for blunt-nosed leopard lizard within the Ciervo-Panoche Natural Area (Service 1998). However, the majority of the Panoche Valley remains unprotected on private lands. In September 2006, the real estate company Schuil and Associates sold a 1,200-acre parcel of rangeland in the Panoche Valley to private interests, and another 9,000 acres of Panoche Valley rangeland are on sale for potential home sites zoned for agricultural rangeland 40-acre minimum site size. The Panoche Creek and Silver Creek were identified as important dispersal corridors within the Ciervo-Panoche Natural Area (Service 1998; Lowe *et al.* 2005; L. Saslaw, BLM, pers. comm. 2006), but the majority of these areas remain unprotected and subject to residential and agricultural development.

Between 1970 and 2000, the human population of the San Joaquin Valley doubled in size; it is expected to more than double again by 2040 (Field *et al.* 1999; Teitz *et al.* 2005). The increasing population combined with the concurrent high demand for limited supplies of land, water, and other resources, has been identified as a principal underlying cause of habitat loss and degradation (Bunn *et al.* 2007).

Numerous large residential housing developments have been proposed in blunt-nosed leopard lizard habitat within the Metropolitan Bakersfield HCP (MBHCP) service area, including the 4,000 acre Gateway Specific Plan, and the 890 acre Canyons residential housing development. Impacts from these large-scale developments would likely extend beyond their physical footprint, considering potential effects upon dispersal corridors and habitat connectivity across the Valley floor. Additionally, the City of Taft recently proposed to expand its sphere of influence to cover roughly 157,570 acres of land (246.2 square miles), including approximately 9,622 acres of land within existing City limits and 147,948 acres of land within the proposed Expansion Area (City of Taft 2009). The recent economic recession in combination with other factors have delayed planning and construction of proposed development in Bakersfield and throughout the Valley; in some cases the applicants have withdrawn their proposals entirely. Nonetheless, blunt-nosed leopard lizard habitat degradation in, and around, Bakersfield, Taft and other urban areas remains a threat on unprotected private lands.

Habitat Threats from Oil and Gas Exploration

Oil and natural gas exploration activities continue to degrade blunt-nosed leopard lizard habitat in western Kern, Kings, and Fresno Counties. The construction of facilities related to oil and natural gas production, such as well pads, wells, storage tanks, sumps, pipelines, and their associated service roads degrade habitat and cause direct mortality to blunt-nosed leopard lizards. Leakage of oil from pumps and transport pipes, and storage facilities, surface mining, and ORV use also degrade blunt-nosed leopard lizard habitat (Madrone Associates 1979; Chesemore 1980; Mullen 1981; Service 1985; Kato and O'Farrell 1986; Service 1998).

From 2001 to present, 38 projects have been permitted through the Oil and Gas Programmatic biological opinion (BLM 2008) with potential to affect blunt-nosed leopard lizards. These 38 projects have impacted approximately 19 acres of occupied or potential habitat. Additionally, under this programmatic opinion the incidental take of four individual blunt-nosed leopard lizards has been reported: one presumed vehicle strike at the Carneros Devils Den area, and one at Kettleman Hills Middle Dome area; and, two assumed predation mortalities. Under the Oil and Gas Programmatic biological opinion, impacts to blunt-nosed leopard lizard habitat are generally minimized by applying a ratio of 3:1 for the purchase and protection of other existing habitat for each acre of suitable habitat impacted (Service 2001, 2003). However, this only results in the protection of existing habitat and not the creation of new blunt-nosed leopard lizard habitat; thus, each project effectively represents a net loss in total habitat.

Formal consultation between the BLM and the Service was initiated on April 10, 2008, for the development of a programmatic biological opinion for seismic exploration projects for which the BLM is the Federal nexus. Thus far, this programmatic opinion is expected to cover four specific projects, and others that may arise in the future. The four seismic exploration projects that have submitted formal requests include: the Buena Vista Seismic Exploration Project near Taft (roughly 128,000 acres) (Occidental of Elk Hills, Inc., *in litt.* 2008); the Chevron's Kettleman Hills Seismic Exploration Project (roughly 131,500 acres) (BioEnvironmental Associates, *in litt.* 2008a); the Aera Energy LLC Seismic Exploration Project near McKittrick (roughly 73,600 acres) (BioEnvironmental Associates, *in litt.*2008b); and, the Belgian Anticline Seismic Exploration Project (roughly 33,270 acres) (E&B Natural Resource Management, *in litt.* 2008). Disturbances associated with these projects are predominantly temporary and are dispersed across large land areas but, nonetheless, have potential to impact blunt-nosed leopard lizards, or adversely affect their habitat. At the time of this review, impacts of these projects on the blunt-nosed leopard lizard are not known. Nonetheless, it is anticipated that blunt-nosed leopard lizards are likely to be adversely affected by vehicle strikes, entombment in burrows, temporary loss or degradation of their habitat, and harassment from noise and vibration. Some blunt-nosed leopard lizards may escape direct injury if burrows are destroyed, but become displaced into adjacent areas. They may be vulnerable to increased predation, exposure, or stress through disorientation, loss of foraging and food base, or loss of shelter. Furthermore, it is expected that any positive results from seismic testing will subsequently result in proposals for oil and gas extraction projects; if these proposals are within listed species habitat, a separate consultation with the Service would be required.

Habitat Threats from the Construction of Water Banking Facilities

The on-going need to provide and secure water supplies for continued urban and rural use throughout California has increased the demand for new construction of water banking facilities. This need was formalized by Executive Order S-06-08 (signed on June 4, 2008 by Governor Arnold Schwarzenegger), which officially declared a statewide drought, and a state of emergency in nine Central Valley Counties with exceptionally urgent water needs: Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern. Currently, the Service is engaged in informal consultation with two proposed water banks that have potential to impact blunt-nosed leopard lizards—Madera Irrigation District's Madera Water Supply Enhancement Project, and Semitropic's Stored Water Recovery Unit. These projects potentially threaten the blunt-nosed leopard lizard by: directly removing habitat (through flooding, or the establishment of infra-structure); changing habitat quality (vegetation structure, higher predation, reduced prey, etc.); and, increasing the incidence of take through vehicle strikes.

The proposed 10,000-acre Madera Water Supply Enhancement Project is proposed as a groundwater recharge bank in western Madera County. The presence of blunt-nosed leopard lizards throughout the proposed site was verified by May 2009 surveys. At this time specific impacts of the project to the blunt-nosed leopard lizards have not yet been determined. However impacts associated with the project are likely given that the project entails the flooding of roughly 700 acres of swale habitat, and the construction of roughly 3,000 acres of percolation ponds. Additional effects to this species, beyond the flooding of suitable habitat, would be attributable to the permanent conversion of habitat to water bank infrastructure including the construction of access roads, powerlines, pipeline and canal conveyance systems, and numerous water extraction well pads. Requirements under the California Environmental Quality Act (CEQA) were completed in September 2005, and the applicant has initiated informal consultation with the Service for this project.

Currently, the Semitropic Water District is proposing the development of a large groundwater extraction project—the Stored Groundwater Recovery Unit—southeast of the Kern NWR, near Semitropic, California (Entrix, GEI Consultants, Inc., and Live Oak & Associates *in litt*. 2008). This project includes the following activities that have potential to affect the blunt-nosed leopard lizard: construction of a well extraction field across five sections of land (roughly 3,000 acres), ancillary well connection pipes, roughly 4 miles of open canal, and 7 miles of large diameter (120-inch) pipeline. The proposed project is located on blunt-nosed leopard lizard habitat near the Semitropic Ridge Preserve and the Kern NWR. At this time, however, potential impacts of the project to the blunt-nosed leopard lizard have not been assessed, but impacts are likely through the permanent conversion of habitat to water bank infrastructure including construction of access roads, powerlines, pipeline and canal conveyance systems, and roughly 65 water extraction well pads. Moreover, the proposed water bank will likely augment the conversion of native lands to agriculture by increasing water supply availability in the southern San Joaquin Valley.

Habitat Threats from Solar Power Developments

Solar power development projects pose potential threats to blunt-nosed leopard lizards and may impact vast amounts of habitat. These projects can destroy, fragment, or impact blunt-nosed leopard lizard habitat by: altering landscape topography, vegetation, and drainage patterns; increasing vehicle-strike mortality; and, reducing habitat quality through interception of solar energy normally reaching the ground surface, affecting ambient air temperatures through habitat shading, and altering soil moisture regimes (Smith 1984; Smith *et al*. 1987). Moreover, recently proposed solar projects tend to be large contiguous blocks of disturbance in undeveloped habitat lands, ranging from hundreds to several thousand acres. Currently, eight solar power farms have been proposed (see Table 3).

Table 3. Solar power projects that have been proposed within blunt-nosed leopard lizard habitat.

Project Name (Applicant)	Location (Region/County/Protected Area)	Proposed Habitat Disturbance (acres)[1]	Status
SunGen (Complete Energy Holdings, Inc., and La Paloma Generating Company LLC)	Valley Floor/Kern	270-290 (P)	Informal consultation has been initiated.
Cymric	Valley Floor/Kern	Unknown	Informal consultation has been initiated.
California Valley Solar Ranch (High Plains Ranch II, LLC, Sun Power Corporation, Systems)	San Luis Obispo/Carrizo Plain	4,365 (P)	Informal consultation has been initiated.
Topaz Solar Farm (First Solar, Inc.)	San Luis Obispo/Carrizo Plain	6,200 (P)	Informal consultation has been initiated.
Carrizo Thermal Solar Farm (Ausra, Inc.)	San Luis Obispo/Carrizo Plain	640 (P); 380 (T)	Formal consultation has been initiated; Ausra, Inc. was purchased by First Solar, Inc. in 2009.
San Joaquin Solar 1 & 2 (San Joaquin Solar, LLC)	Foothills/Fresno/Coalinga	640 (P)	Informal consultation has been initiated.
Sun City and Sun Drag	Foothills/Kings/Avenal	Approximately 1000 (P)	Informal consultation has Not been initiated
Solargen Solargen Energy, Inc.	Foothills/Fresno/Panoche Valley	Total amount not determined but will be between 7,000 and 29,000 (P)	Informal consultation has been initiated.
Notes: [1] Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T).			

Conservation Efforts and Habitat Protection

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permits include take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs area summarized in Table 4 below, and described in further detail in Appendix B. Effectively, through section 10 consultations and the HCP process, 89,288 acres of habitat land have been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft).

The Central Valley Project (CVP) was constructed to protect the Central Valley from water shortages and floods. Irrigation water provided through the CVP subsequently facilitated the conversion of native habitats to agricultural lands (Bureau of Reclamation 2006). The effect of this large-scale loss of native habitat reduced populations of several species, which resulted in the listing of over twenty species in the San Joaquin Valley under the under the Act.

Subsequently, Congress passed the Central Valley Project Improvement Act (CVPIA) in 1992, mandating changes in the management of the CVP particularly for the protection, restoration, and enhancement of fish and wildlife. The CVPIA is comprised of several programs, including the CVPIA Habitat Restoration Program (HRP; §3406(b)(1) of the CVPIA). The Central Valley Project Conservation Program (CVPCP) was the result of a section 7 consultation with the Bureau of Reclamation (BOR) for Friant Dam water contracts.

Under the CVPCP, the blunt-nosed leopard lizard was designated as a very high priority for recovery due its imminent threat of extinction, and the fact that CVP actions significantly contributed to the species decline, either directly or indirectly and given that the species is considered to have an imminent threat of extinction. The CVPCP program is funded at approximately 2.3 million dollars annually, and has thus far funded 84 total projects since its commencement; 11 of the 84 are within alkali scrub or annual grassland habitat and specifically include the blunt-nosed leopard lizard as a focal species. Principally these projects have included habitat protection and restoration through the establishment of conservation easements and land acquisition in fee title (see Table 5). Other CVPCP goals for the recovery of the blunt-nosed leopard lizard include: determine habitat management and compatible land uses; conduct surveys for species presence and absence; and, protect key habitat areas within the known range of the species.

A principal program under the CVPIA HRP is the Land Retirement Program (Law 102-575 Title 34, Section 3408(h)), which is designed to reduce irrigated agricultural drainage problems. It comprises an interagency Department of Interior Land Retirement Team and includes representatives from BOR, the Service, and the BLM. It was estimated that by 2040 approximately 400,000 to 554,000 acres of land would become unsuitable for irrigated agriculture if no actions were taken to remedy drainage problems. Under this program, those irrigated agricultural lands that are characterized by low productivity, poor drainage, shallow water tables, and high groundwater selenium concentrations would be retired from irrigated

Table 4. Since the time of listing, 14 HCPs have been developed and implemented (note the California Aqueduct San Joaquin Field Division HCP is currently in draft form); additional information is provided in Appendix B.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Coles Levee	Valley Floor/Kern	990	Coles Levee Ecosystem Preserve	270 (P)	HCP is not currently valid
Coalinga Cogeneration	Foothills/Fresno	179	On-site	49.6 (P); 27.6 (T)	June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.
California Department of Corrections Delano Prison	Valley Floor/Kern	348/514	On-site /Allensworth ER	287 (P); 348 (T)	Compensation includes habitat enhancement and revegetation
California Department of Corrections Statewide Electrified Fence Project	Valley Floor/Kern	282/800[2]	Allensworth ER	Take of 2 Individuals	A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003)
Chevron Pipeline	Valley Floor/Kern/Lokern	28	Lokern Area	25.5 (T)	
Granite Construction Phase I	Foothills/Fresno/Coalinga	162	Semitropic Ridge ER	54 (P)	

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Kern County Waste Facilities	Valley Floor/Kern	755[3]	Coles Levee Ecosystem Preserve	251 (P)[3]	Project impacts are limited to 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres near Taft in Kern County
KWB Authority	Valley Floor/Kern	4,263	On-site	12,081 (P); 291 (T)	
Metropolitan Bakersfield	Valley Floor/Kern	3:1 compensation for Natural Lands	Off-site	15,200 (P)	Acquired throughout the duration of the HCP as impacts are incurred; the HCP is valid until 2014.
Nuevo Torch	Valley Floor/Kern	840	Lokern Area	850 (P)	Now called PXP
California Aqueduct San Joaquin Field Division	Valley Floor/Kern	567/3,474[4]	On-site	340 (P); 835 (T)	HCP is currently in draft form. Total impacts are limited to 1,295 acres: 1,185 acres of impact will be compensated at time of issuance, 110 acres of impacts will be compensated as they occur

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)[1]	Comments
Seneca and Enron Oil and Gas	Valley Floor/Kern			650 (P)	
Enviro Cycle	Valley Floor/Kern			20 (P)	
Pacific Gas and Electric	Valley Floor and Foothill Regions/ Nine Counties of the San Joaquin Valley/All Protected Areas except Carrizo Plain	360	Areas of occupied and/or suitable habitat to be conserved in perpetuity via future conservation easement	9 (P); 690 (T)	An additional 3, 930 acres of covered activities may occur in suitable habitat
Total		**89,288[5]**		**29,382.6 (P); 1,527.1 (T)**	

Notes: [1]Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T); [2]Compensation included acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and an additional 800 acres of low quality laser-leveled farmland, both at Allensworth ER; [3]These figures are comprehensive for compensation and impacts associated with the HCP, and not specific to blunt-nosed leopard lizard impacts specifically; [4]567 acres will be compensated through traditional Service procedures, while the 3,474 acres will be managed to conserve habitat to the maximum extent possible (i.e., habitat may be disturbed or impacted during emergency maintenance and operational procedures); and, [5]This total does not include habitat conservation lands acquired by CDFG through the Metropolitan Bakersfield HCP, and also does not include the 3,474 acres that DWR will manage under the proposed draft California Aqueduct San Joaquin Field Division HCP.

agriculture through a willing seller program. The original goal under the Land Retirement Program was set at 15,000 acres (see Table 5). However, the actual acreage retired thus far for restoration is limited to 9,306 acres: 7,216 acres at Atwell Island in southwestern Tulare County and 2,090 acres at the Tranquility in western Fresno County. The restoration of former irrigated agricultural lands to arid upland and alkali sink habitat are expected to benefit the blunt-nosed leopard lizard. As noted in Table 5, goals for Atwell Island are set at 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres, or 5,051 acres at Atwell Island would be restored to alkali sink habitat suitable to support blunt-nosed leopard lizards; 2,090 acres at the Tranquility site would be restored to uplands or alkali sink.

Under the CVPCP, HRP or Land Retirement Program there was no obligation for BOR to purchase and conserve a specific amount of land. Conversely however, the California State Water Resources Control Board (SWRCB) in Decision-1641 imposed a mitigation requirement on the Bureau of Reclamation for agricultural land conversions that occurred prior to December 29, 1999 outside the CVP contract supply Consolidated Place of Use. The requirement is referred to as the Encroachment Mitigation. This Decision, which included specific requirements for alkali scrub habitat and grassland habitat, is significant for the recovery of blunt-nosed leopard lizard. The SWRCB identified 45,390 acres of habitat including 23,165 acres of alkali scrub habitat (primarily in the Westlands Water District of western Fresno County) that was converted without authorization under the Act to plowed and irrigated agriculture land, and that needs to be mitigated with in-kind habitat acquired by 2010 (SWRCB 2000). As of May 2009 roughly 9,397 acres (or 40.6 percent of the required 23,165 acres) of alkali scrub habitat had been acquired by BOR (D. Kleinsmith, BOR, *in litt.* 2009). Furthermore, in total only 25,706 acres of habitat for any species had been acquired by May 2009 (as noted in Table 5, 4,960 acres of grassland habitat is speculated to be suitable for blunt-nosed leopard lizards (D. Kleinsmith, *in litt.* 2009).

Although these land acquisition and retirement programs may protect habitat suitable for blunt-nosed leopard lizards, it should be qualified that the suitability of these lands to support blunt-nosed leopard lizard has been only coarsely determined by BOR at this time; the suitability in terms of habitat quality and landscape connectivity has not yet been evaluated by the Service. The biological opinion for the Land Retirement Program (Service 1999) recommended a 5-year Habitat Restoration Study (HRS) to determine the responses of wildlife to land retirement and restoration efforts. HRS objectives were to determine the efficacy of revegetation with native plants and microtopographic contouring for upland habitat restoration and to examine the responses of plants and wildlife at the 800-acre Tranquility study site. Beginning in 1999, vegetation, invertebrates, amphibians, reptiles, birds, and small mammals were all monitored throughout the duration of the project. The California king snake (*Lampropeltis getulus californiae*), gopher snake (*Pituophis melanoleucus*), and western whiptail (*Cnemidophorus tigris multiscutatus*) were the only reptile species observed at the Tranquility site. It is anticipated that species in the vicinity of the Tranquility Site will re-inhabit the area; however due to the distance to the nearest known population, blunt-nosed leopard lizards would most likely have to be reintroduced to the retired lands. To date, there is no available research on

Table 5. Summarized status of BOR acquired mitigation, from the 2007 Consolidated Place of Use Encroachment, which espouses habitat compensation from existing programs, including: CVPCP, HRP, Land Retirement Program projects, as well as BOR's wetlands program (D. Kleinsmith, *in litt.* 2009).

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
ALKALI SCRUB:								
Allensworth Ecological Reserve Addition	Alkali scrub	San Joaquin kit fox, Tipton kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard.	360	Protection	Tulare and Kern	1998	100%	360
Carrizo Plains National Monument Inholdings	Alkali scrub	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover's wooly star.	665	Protection	Kern	2007	100%	665
Elgorriago Ranch	Alkali scrub	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,231	Protection	Fresno and San Benito	2007	100%	1,231

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Goose Lake Land Acquisition	Alkali scrub	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Land Retirement Demonstration Project (Atwell Island and Tranquility)	Alkali scrub	Potential for all San Joaquin Valley species.	7,141 (5,051 and 2,090, respectively)[2]	Restoration	Fresno, Kings, and Tulare	Unknown	100%	7,141
TOTAL ACRES FOR ALKALI SCRUB		**23,165 acres owed**	**9,397 acres acquired**					**9397**
ANNUAL GRASSLAND: 17,573 acres owed								
Bayou Vista Property	Annual grassland	Swainson's hawk, Tipton kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard.	515	Protection	Tulare	2004	46%	236.9

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Carrizo Plains National Monument Inholdings	Annual grassland	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover's wooly star.	800	Protection	Kern	2007	100%	800
Elgorriago Ranch	Annual grassland	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,400	Protection	Fresno and San Benito	2007	100%	1,400
Goose Lake Land Acquisition	Annual grassland	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Pixley NWR Acquisition	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard, Tipton kangaroo rat.	345	Protection	Tulare	2006	100%	345

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated[1]	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Romero and Simon-Neuman Ranches	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard.	24,589	Protection	Stanislaus, Santa Clara, Merced	1988 to 1999	9.40%	2,311.4
TOTAL ACRES FOR ANNUAL GRASSLAND		**17,573 acres owed**	**4.960 acquired**					**4,960**

Note: [1]The suitability of these lands to support blunt-nosed leopard lizard has been determined by BOR, and has not been reviewed by the Service.[2]Thus far, BOR has acquired 9,306 acres—7,216 acres at Atwell Island and 2,090 acres at Tranquility; however unlike the Tranquility site, restoration goals for Atwell Island are 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres (5,051.2 acres) at Atwell Island would be alkali sink habitat suitable for the blunt-nosed leopard lizard; whereas, all 2,090 acres at the Tranquility site would be restored to uplands or alkali sink. The total upland habitat or alkali sink habitat for land retirement is 5,051.2 + 2,090 = 7,141.2.

the ability of blunt-nosed leopard lizard to recolonize fallow fields and whether the Land Retirement Program will be successful in providing habitat for the species.

Additionally, the future ownership and status of these lands—whether they would be restored to habitat, or utilized for other purposes (i.e., dry-farmed)—remains unknown. The Land Retirement Program, however, while preventing the application of CVP water to agricultural fields, does not prevent the application of irrigation water from other sources or require the restoration of the lands to native habitat. Often an alternative irrigation supply is provided to the land, which in turn prevents the return of most agricultural fields back to natural habitat.

Furthermore, at present, Reclamation does not plan to pursue any further land acquisitions under the land retirement program authorization (D. Kleinsmith, pers. comm. 2009). Thus it is unlikely that BOR will acquire the additional 16,141 acres by the court ordered deadline.

In conclusion, it is currently unknown whether these programs will offset the blunt-nosed leopard lizard habitat losses that have occurred. Further assessment on the effects of these programs, combined with supplemental research, will be required to determine their contribution on blunt-nosed leopard lizard recovery.

<u>Summary of Factor A Threats</u>

In summary, broad-scale land conversion of natural habitat has resulted in substantial reduction of available blunt-nosed leopard lizard habitat. Service databases report that roughly 35,000 acres of permanent impacts and 10,000 acres of temporary disturbance have been authorized within blunt-nosed leopard lizard habitat (note: these values do not include those acres of additional impacts to scrub and grassland from those programs described above, under the CVP).

Fragmentation of residual habitat, which further isolates remaining blunt-nosed leopard lizard populations, continues due to on-going agricultural conversion of natural habitat, residential development, oil and gas exploration and extraction activities. Though several HCPs and biological opinions, as well as the CVPCP, CVPIA, and Decision-1641 have resulted in the conservation of substantial amounts of land acreage, the use and recolonization of these conserved lands by blunt-nosed leopard lizards is limited by the fragmentation and isolation of the parcels, the distribution of remaining populations, and dispersal abilities of the species.

II.C.2.b. Factor B, Overutilization for commercial, recreational, scientific, or educational purposes

At the time of listing, overutilization for commercial, recreational, scientific, or educational purposes was not considered to be a threat, and is not discussed as a threat in the 1998 Recovery Plan. There are no updates relevant to this factor, nor has the potential of this threat increased noticeably since the 1998 Recovery Plan.

II.C.2.c. Factor C, Disease or predation

At the time of listing predation was not considered a potential threat to survival of the species and its recovery. Montanucci (1965) reported that the list of predators in Madera and Fresno

Counties of the blunt-nosed leopard lizard included the following species: spotted skunk (*Spilogale putorius*), ground squirrel (*Citellus beecheyi*), shrike (*Lanius ludovicianus gambeli*), American kestrel (*Falco sparverius*), burrowing owl (*Speotyto cunicularia hypugaea*), roadrunner (*Geococcyx californianus*), whipsnake (*Masticophis flagellum ruddocki*), gopher snake (*Pituophis catenifer*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and badger (*Taxidea taxus*).

The following animals are currently known to prey on blunt-nosed leopard lizards: whip snakes, gopher snakes, glossy snakes (*Arizona elegans*), western long-nosed snakes (*Rhinocheilus lecontei*), northern Pacific rattlesnakes (*Crotalus viridis oreganus*), common king snakes, western rattlesnakes, loggerhead shrikes (*Lanius ludovicianus*), American kestrels (*Falco sparverius*), prairie falcons (*Falco mexicanus*), burrowing owls (*Athene cunicularia*), greater roadrunners (*Geococcyx californianus*), golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), California ground squirrels, spotted skunks (*Spilogale putorius*), striped skunks (*Mephitis mephitis*), American badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and San Joaquin kit foxes (Montanucci 1965; Tollestrup 1979b; Hansen *et al.* 1994; Germano and Carter 1995; Germano and Brown 2003). This list is likely not exhaustive for all incidences of predation that occur across the range of the blunt-nosed leopard lizard, nor has the magnitude of effects derived by predation on population trend and stability been researched at this time. Thus it remains unknown as to whether predation is a major threat to the survival and recovery of this species.

Without mammal burrows, blunt-nosed leopard lizards are more susceptible to predation (Hansen *et al.* 1994). The construction of artificial perches (i.e., fence posts) for burrowing owls, and other predators increases the risk of predation on blunt-nosed leopard lizards (L. Saslaw, BLM, pers. comm. 2006). Additionally, the territorial behavior of blunt-nosed leopard lizard males may expose them to higher rates of predation than if they were secretive (Tollestrup 1982, 1983; Germano and Carter 1995; Lappin and Swinney 1999).

There are no known diseases in blunt-nosed leopard lizards, but endoparasites (nematodes) and ectoparasites (mites and harvest mites) have been reported (Montanucci 1965). The overall effect of the parasites on the blunt-nosed leopard lizard is not currently known.

II.C.2.d. Factor D, Inadequacy of existing regulatory mechanisms

The blunt-nosed leopard lizard was listed as endangered under the Act in 1967, and subsequently listed as an endangered species by the State of California in 1971. At the time of Federal listing, many of the current environmental laws did not yet exist.

There are several State and Federal laws and regulations that are pertinent to federally listed species, each of which may contribute in varying degrees to the conservation of federally listed and non-listed species. These laws, most of which have been enacted in the past 30 to 40 years, have greatly reduced or eliminated the threat of wholesale habitat destruction, although the extent to which they prevent the conversion of natural lands to agriculture is less clear.

State Laws and Regulations in California

The State's authority to conserve rare wildlife and plants is comprised of four major pieces of legislation: the California Endangered Species Act, the Native Plant Protection Act, the California Environmental Quality Act, and the Natural Community Conservation Planning Act.

California Endangered Species Act (CESA): The CESA (California Fish and Game Code, section 2080 *et seq*.) prohibits the unauthorized take of State-listed threatened or endangered species. The blunt-nosed leopard lizard was listed as endangered by the State of California in 1971. The CESA requires State agencies to consult with the California Department of Fish and Game on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities. The blunt-nosed leopard lizard was listed as State endangered species under CESA on June 27, 1971.

California Department of Fish and Game Code §5050--Fully Protected Reptiles and Amphibians Species: The blunt-nosed leopard lizard is a fully-protected animal under the California Fish and Game Code §5050; fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. Therefore salvage and relocation for this species is not currently an option under State law.

California Environmental Quality Act (CEQA): The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Planning Act: The Natural Community Conservation Program is a cooperative effort to protect regional habitats and species. The program helps identify and provide for area wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many Natural Community Conservation Plans (NCCPs) are developed in conjunction with Habitat Conservation Plans (HCPs) prepared pursuant to the Federal Endangered Species Act.

Federal Laws and Regulations

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq*.) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects

(40 **CFR** 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

Clean Water Act: Under section 404, the U.S. Army Corps of Engineers (Corps or USACE) regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term "wetland" refers to areas meeting the Corps's criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act, National Environmental Policy Act, and Endangered Species Act. These reviews require consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts.

Although the blunt-nosed leopard lizard is an upland species typically found in landscapes with limited jurisdictional waters under the Clean Water Act, the Corps has frequently assumed the role of the Federal nexus for both large and small projects in their entirety, even though these projects may only impact a minor amount of jurisdictional water. This approach by the Corps has facilitated numerous consultations under section 7 of the Act that would have otherwise likely required a section 10 permit.

Historically, the Corps interpreted "the waters of the United States" expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving "isolated" wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their "isolated" nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a "significant nexus" standard that may protect some, but not all, isolated wetland habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat, is not known at this time.

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law providing protection for this species. The Service's responsibilities include administering the Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 **CFR** 402.02). A non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines "take" to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Service regulations (Service 2003) define "harm" to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 **CFR** 402.02). For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project's adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California's related Natural Community Conservation Planning program.

Conversion of land for agricultural purposes continues to be the most critical threat to listed species. Although the increment of habitat loss attributable to urban development appears to be increasing, these activities remain less significant than agriculture for most species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it usual for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

<u>Sikes Act</u>: The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the use of military installations to ensure the readiness of the Armed Forces. The INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically regulatory mechanisms because their implementation is subject to funding availability, they can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands.

Federal Land Policy and Management Act of 1976 (FLPMA): The Bureau of Land Management is required to incorporate Federal, State, and local input into their management decisions through Federal law. The FLPMA (Public Law 94-579, 43 U.S.C. 1701) was written "to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development and enhancement of the public lands; and for other purposes." Section 102(f) of the FLPMA states that "the Secretary [of the Interior] shall allow an opportunity for public involvement and by regulation shall establish procedures … to give Federal, State, and local governments and the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands." Therefore, through management plans, the Bureau of Land Management is responsible for including input from Federal, State, and local governments and the public. Additionally, Section 102(c) of the FLPMA states that the Secretary shall "give priority to the designation and protection of areas of critical environmental concern" in the development of plans for public lands. Although the Bureau of Land Management has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the Bureau of Land Management also has the ability under the FLPMA to establish and implement special management areas such as Areas of Critical Environmental Concern, wilderness, research areas, etc., that can reduce or eliminate actions that adversely affect species of concern (including listed species).

National Wildlife Refuge System Improvement Act of 1997: This act establishes the protection of biodiversity as the primary purpose of the National Wildlife Refuge system. This has lead to various management actions to benefit federally listed species.

Summary of Factor D

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1967. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

II.C.2.e. Factor E, Other natural or human made factors affecting its continued existence

Although the final rule listing for the blunt-nosed leopard lizard did not include a discussion of threats to the species, agricultural pesticides especially for control of beet leafhopper was identified as a threat near the time of listing (Montanucci 1965). Since the time of listing we have identified the following additional threats: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Furthermore, research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Altered vegetation communities (grazing, exotic grasses, wildfire regime)

The southern San Joaquin Valley of California, as with much of western North America, has been invaded by non-native plant species, since European cattle were brought to the region in the 1500s. Research has reported that the exponential increase in exotic plants has paralleled the increase in human population growth in California (Randall *et al.* 1998). The following exotic species are frequently observed within blunt-nosed leopard lizard habitat, and have adversely affected the species: *Bromus rubens madritensis* (red brome), *Vulpia myuros* (mouse tail fescue) *Schismus arabicus* (Arabian grass), *Hordium murinum glaucum* (foxtail), *Bromus diandrus* (ripgut brome), and *Bromus bordeaceus* (soft chess) (Biswell 1956; Heady 1977; Germano *et al.* 2001). The timing of germination for these introduced grasses is often earlier than most native species, which effectively gives the non-native species a competitive advantage over native plant species for water, nutrients, and sun light. Additionally, an overabundance of residual thatch from the previous year's non-native grass production can have similar adverse effects by shading out or obstructing native seedlings.

Vegetation changes include levels of biomass, cover, density, community structure, or soil characteristics. Changes have generally been attributed to the negative affects of off-highway vehicle use, overgrazing by domestic livestock, agriculture, urbanization, construction of roads and utility corridors, air pollution, military training exercises, and other activities (Lovich and Bainbridge 1999). These authors also reported that secondary contributions to degradation include the proliferation of exotic plant species, higher frequency of anthropogenic fire events, and increased nitrogen deposition. Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Introduced grasses and herbs often create an impenetrable thicket for small ground-dwelling vertebrates. Blunt-nosed leopard lizard movement is restricted in dense herbaceous cover, as observed with the ease of catching them by hand in dense grass compared to more open habitats (Germano *et al.* 2001; Germano *et al.* 2004). Radiotelemetry studies near the Elk Hills have documented that blunt-nosed leopard lizards are generally restricted to more open habitats (e.g. washes, roads, grazed pastures) when grass cover is thick, but they may utilize grassland areas if the herbaceous cover is sparse (Warrick *et al.* 1998).

The detrimental ecological effects of livestock grazing have been documented on western lands (Fleischner 1994; Noss 1994). Overgrazing may negatively affect blunt-nosed leopard lizards by soil compaction, damaging rodent burrows that the lizards depend on for cover, and stripping away vegetative cover used by both the lizard and its prey (Hansen *et al.* 1994). However, the cessation of grazing is likely to be even more detrimental to blunt-nosed leopard lizard due to the dense growth of exotic grasses as discussed below (Germano *et al.* 2001; Germano *et al.* 2005).

Long-term studies of blunt-nosed leopard lizard population trends on the Elkhorn Plain and Pixley NWR have shown dramatic declines in numbers following consecutive wet years (Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006). On Elkhorn Plain, the decline in blunt-nosed leopard lizard numbers was shown to occur with consecutive years of dense herbaceous cover above 0.65 ounces/ft^2 in the 1990s (Germano *et al.* 2004). Annual grazing studies in the Lokern area from 1997 to 2005 have demonstrated the benefits of livestock grazing in reducing exotic grasses and increasing blunt-nosed leopard lizard numbers (Germano *et al.* 2005). Therefore, recent decisions to severely restrict or eliminate livestock grazing from conservation lands may negatively affect blunt-nosed leopard lizards, especially during wet years (Germano *et al.* 2001). The BLM offices in Hollister and Bakersfield, California, are currently updating their Resource Management Plans (RMP) with respect to grazing in the Ciervo-Panoche areas and the Carrizo Plain National Monument, respectively. Grazing on the Carrizo Plain National Monument is particularly controversial.

Prescribed fire has been analyzed as an alternative habitat management tool, but in an unpublished study, it was less effective than grazing at controlling exotic grasses, and the positive effects lasted for less than one year (L. Saslaw *in litt.* 2006). Additionally, a prescribed burn had the unintended negative consequence of permanently removing native saltbush (Germano *et al.* 2001; Warrick 2006).

The preponderance of exotic grasses in blunt-nosed leopard lizard habitat in the San Joaquin Valley may be partly attributed to elevated levels of atmospheric nitrogen (N) deposition in ecosystems that are naturally N-limited. Weiss (1999) found that dry N deposition from smog in the San Francisco Bay Area has enabled the invasion of exotic annual grasses into native grasslands on nutrient-poor, serpentitic soils resulting in the loss of habitat for the federally threatened bay checkerspot butterfly (*Euphydras editha bayensis*). Other researchers found that increased levels of soil N from elevated atmospheric N deposition in the Mojave Desert could increase the dominance of exotic annual grasses and thereby raise the frequency of fire (Brooks 1999, 2003; Brooks and Pyke 2001).

Of the protected areas with management plans (see Table 1), grazing is employed as a management technique to reduce exotic weed infestations in the following areas:

- All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006);
- The entire Wind Wolves Preserve site is currently grazed by livestock (D. Clendenen, Wildlands Conservancy, pers. comm. 2006);
- The portion of the Semitropic Ridge Preserve administered by the CNLM is grazed by sheep (Warrick *in litt.* 2006), while none of the CDFG administered lands currently have any grazing leases;
- The 1,369 acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat;
- Less than one-fourth of the KWB Conservation Lands are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006).

<u>Vehicle strikes</u>
Blunt-nosed leopard lizard mortality is known to occur as a result of regular automobile traffic and ORV use (Tollestrup 1979b; Uptain *et al.* 1985; Williams and Tordoff 1988). Roads typically surround and often bisect remaining fragments of habitat, increasing the risk of mortality by vehicles and further isolating populations (Service 1998). The blunt-nosed leopard lizard's preference for open areas, such as roads (Warrick *et al.* 1998), makes them especially vulnerable to mortality from vehicle strikes. On May 22, 2005, a blunt-nosed leopard lizard was

reported killed by a vehicle strike on an access road in the Devils Den Oilfield of northwestern Kern County; the road is used by oilfield personnel and ranchers (Booher *in litt.* 2005). On July 19, 2006, a blunt-nosed leopard lizard was reported killed by a vehicle strike on an access road at the Carneros Devils Den area in Kern County, and also at the Kettleman Hills Middle Dome site in Kings County (Garcia *in litt.* 2006; BLM 2008).

During habitat conversion activities, individuals could be killed or injured by operation of heavy equipment (crushing, burial by earthmoving equipment, discing, grading, mowing) or flooding of habitat. Individuals could be harassed during construction by noise, ground vibrations and compaction of burrows, construction lighting, and disruption of foraging and breeding behavior. Individuals not killed directly by operation of equipment would probably find themselves in suboptimal habitat with a decreased carrying capacity due to lower availability of foraging and breeding habitat and greater vulnerability to predation. If individuals were displaced from converted lands into nearby native habitat population densities, intraspecific competition, and predation pressure would be likely to increase. Animals which lost their fear of humans could become more vulnerable to shooting, poisoning, and roadkill.

<u>Waterfowl blinds</u>
Waterfowl blinds are large drums dug part way into the ground and placed at the edges of playas to conceal hunters. When left uncovered, these structures are pitfall traps for blunt-nosed leopard lizards and other reptiles and small mammals resulting in their mortality. In 1991, six blunt-nosed leopard lizards were retrieved from waterfowl blinds around two playas at the Semitropic Ridge Preserve. In 1994, 10 blunt-nosed leopard lizards and 17 Tipton kangaroo rats were found dead in waterfowl blinds (Germano 1995). This author also recommended that hunting clubs should be informed of this problem and active waterfowl blinds should be covered when not in use; abandoned blinds should be removed or filled in. At this time, however, waterfowl blinds are only being retrofitted with covers, or removed on a case by case basis.

<u>Pesticides Use</u>
Pesticide use may directly and indirectly affect blunt-nosed leopard lizards (Jones and Stokes 1977; California Department of Food and Agriculture (CDFA) 1984; Service 1985; Williams and Tordoff 1988; Germano and Williams 1992b). The use of pesticides reduces food available for reproducing blunt-nosed leopard lizards in the spring, and later for hatchlings when they should be storing fat to sustain themselves during their first winter (Kato and O'Farrell 1986). The most expansive pesticide program within the range of the blunt-nosed leopard lizard is the broad-scale use of malathion. Malathion is a pesticide regulated by the California Department of Food and Agriculture, and is typically aerially distributed across much of the blunt-nosed leopard lizard range to reduce impacts of the curly top virus on sugar beet production. The most important effect of malathion upon blunt-nosed leopard lizard survival and recovery is the associated reduction in insect prey populations which can last between 2 to 5 days (CDFA 1984).

In a 2000 biological opinion, the Service authorized the renewal of a five-year pesticide use permit to CDFA for use of malathion which included measures to protect the blunt-nosed leopard lizard (Service 2000). These measures allow the aerial application of malathion in some blunt-nosed leopard lizard conservation areas prior to April 15 and after October 15; thus, avoiding the primary blunt-nosed leopard lizard activity period. Notably, in 2006 CDFA treated 53,965 acres with malathion in Kern, Kings, and Fresno Counties (CDFA 2006). The CDFA pesticide use permit for malathion is currently being revised through formal consultation with the Service. Other unregulated pesticides (e.g., common household pyrethroids [California Department of Pesticide Regulation 2006; Keith 2006]) likely pose additional threats to blunt-nosed leopard lizards by reducing insect prey populations. One recent study on the effects of malathion on insect abundance showed a significant decline in the number of ants in malathion-treated plots relative to control plots (Redak 2006); ants are a likely food source for blunt-nosed leopard lizards. Germano *et al.* (2007) reported that the effects of spraying malathion within blunt-nosed leopard lizard habitat remained largely speculative, but warrant expeditious research.

Fumigating rodents in burrows may also harm blunt-nosed leopard lizards that shelter in those burrows (Hansen *et al.* 1994). The U.S. Environmental Protection Agency (USEPA) bulletins governing use of rodenticides have greatly reduced the risk of significant mortality to blunt-nosed leopard lizard populations. The California EPA, CDFA, county agricultural departments, CDFG, and the USEPA collaborated with the Service in the development of County Bulletins that both are efficacious and acceptable to land owners (Service 1998). However, the use of rodenticides in blunt-nosed leopard lizard habitat continues to be a potential threat to the species as this effectively reduces the number of rodents available to dig burrows for secondary use by blunt-nosed leopard lizards.

<u>Climate change</u>
Long-term monitoring studies (Germano *et al.* 1994; Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006) show that blunt-nosed leopard lizard populations drastically decline during consecutive years of drought or above average precipitation. Also, blunt-nosed leopard lizard aboveground activity is highly dependent upon temperature. Optimal activity occurs when air temperatures are 74 to 104 degrees Fahrenheit and ground temperatures are 72 to 97 degrees Fahrenheit (Service 1985, 1998). Therefore, blunt-nosed leopard lizard population stability and behavior is very sensitive to any changes in precipitation or temperature. Climate models predict for California an overall warming of 3.0 to 10.4 degrees Fahrenheit by 2100 (Cayan *et al.* 2006) but vary in their predictions for precipitation. VanRheenen *et al.* (2004), however, predicts a decrease in precipitation in the southern San Joaquin. Any significant changes in temperature or precipitation could have drastic effects on blunt-nosed leopard lizard populations. Climate change will likely result in changes in the vegetative communities of blunt-nosed leopard lizard habitat and potentially increase exotic species. However, there is insufficient data available at this time to predict the effects of climate change on the blunt-nosed leopard lizard.

Summary of Factor E
In summary the following threats, since the time of listing the following additional threats to the blunt-nosed leopard lizard have been identified: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. These on-going threats pose additional challenges to successful blunt-nosed leopard lizard recovery.

II.D. Synthesis

At the time the species was listed, conversion of natural habitat into agricultural lands in the San Joaquin Valley resulted in the reduction of blunt-nosed leopard lizard habitat to less than 15 percent of its historic range (Service 1985; Germano and Williams 1992a; Jennings 1995). Remaining habitat is highly fragmented and confined to a few scattered areas from southern Merced County to western Kern County (Hansen *et al.* 1994). The blunt-nosed leopard lizard continues to be threatened by degradation to its habitat from the on-going modification and conversion of existing habitat to agriculture, petroleum and mineral extraction, residential and commercial development. In addition, altered vegetation communities (due to grazing, nonnative grasses, and altered wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, rodenticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Although some progress in recovery of the species has been made within the southern range of blunt-nosed leopard lizard, the majority of the recovery criteria outlined in the Recovery Plan have not been achieved (see Table 1). The downlisting criteria for the blunt-nosed leopard lizard require the protection of at least 5,997 acres of contiguous habitat in five specified recovery areas representing the geographic range of the species (three in the foothills and two on the Valley floor). Also required for each protected area is the stability of the population (greater than 2 blunt-nosed leopard lizards per hectare through a precipitation cycle) and the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. Only in the Carrizo Plain Natural Area is the acreage requirement surpassed with the establishment of the Carrizo Plain National Monument; however, long-term population surveys show significant declines in the population during wet years. The 5,278 acre Semitropic Ridge Preserve approaches the acreage requirement for Valley floor habitat in Kern County, but blunt-nosed leopard lizard population densities there are too low. Blunt-nosed leopard lizard habitat is protected in smaller fragments in the foothills of western Kern County and the Ciervo-Panoche area; however, there are no preserves protecting blunt-nosed leopard lizard populations on the Valley floor in Merced or Madera Counties. Therefore, the downlisting criteria have not been met.

In summary, based on the lack of protection of sufficient habitat representing the geographic range of the species, the low density and instability of the populations, and the continuation of threats to the species, we conclude that the blunt-nosed leopard lizard continues to meet the definition of endangered, and is in danger of extinction throughout its known range.

III. RESULTS

III.A. Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__X__ No change is needed

III.B. New Recovery Priority Number __N/A__

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

The five most important actions that should be taken within the next five years to facilitate the recovery of the blunt-nosed leopard lizard include:

1. Facilitate research on the effects of solar projects on blunt-nosed leopard lizard behavior and compatibility.
2. Establish corridors between existing natural areas in Kern and Tulare Counties (i.e., Buena Vista Valley, Elk Hills, Lokern Natural Area, Buttonwillow ER, Semitropic Ridge Preserve, Kern NWR, Allensworth ER, Pixley NWR) (Service 1998; Selmon *in litt.* 2006) to enhance the metapopulation recovery strategy.
3. Establish a preserve or conservation easement on the natural lands of Madera Ranch in western Madera County (Service 1998). Protect blunt-nosed leopard lizard habitat in the Panoche Valley and in dispersal corridors in western Fresno County—Panoche Creek and Silver Creek (Service 1998; Lowe *et al.* 2005), Anticline Ridge, the western rim of Pleasant Valley, Guijarral Hills, and the north end of the Kettleman Hills (Service 1998).
4. Include the flexibility to alter the dates and stocking rates of livestock within all RMP where blunt-nosed leopard lizards have potential to occur, including the Carrizo Plain National Monument RMP, Bakersfield RMP, Caliente RMP and Hollister RMP to adaptively manage annual plant production and prevent the dominance of exotic grasses in blunt-nosed leopard lizard habitat (Germano *et al.* 2001); grazing prescriptions should be tailored to suit the ecological needs specific to the area.
5. Coordinate with hunting clubs for blunt-nosed leopard lizard protection: active waterfowl blinds should be covered when not in use, and abandoned blinds should be removed or filled in to prevent entrapment of blunt-nosed leopard lizard and other wildlife (Germano 1995).

Other important actions that are important to facilitate blunt-nosed leopard lizard recovery include the following items.

Kern County--completion of HCPs and issuance of incidental take permits

- Complete the Kern County Valley Floor HCP
- Complete the Chevron Lokern HCP
- Complete the Oxy of Elk Hills HCP
- Encourage Crimson Resource Management to start an HCP or section 7 formal consultation to protect lands in Buena Vista Valley, NPR-2, and Buena Vista Hills

Habitat management

- Assist the Lokern Coordination Team in the development of the 44,000-acre Lokern Natural Area in western Kern County

Future research and monitoring

- Continue long-term monitoring of population trends on the Valley floor (e.g., Pixley NWR, Lokern Natural Area, Semitropic Ridge Preserve, Buttonwillow ER) and in the foothills (e.g., Carrizo Plain Natural Area , Elk Hills) (Germano and Williams 1992b; Service 1998)
- Census and monitor blunt-nosed leopard lizard populations in western Madera County, central Merced County, and the Ciervo-Panoche Natural Area (Service 1998)
- Study the effects of grazing on blunt-nosed leopard lizard along precipitation gradients in the Elkhorn and Carrizo Plains to determine appropriate grazing prescriptions specific for each area
- Facilitate research on the effects of CVPCP and CVPIA programs on blunt-nosed leopard lizard recovery. Study the effects of translocation (e.g., Allensworth ER) and agricultural land retirement (e.g., Tranquility and Atwell Island sites) on blunt-nosed leopard lizard (Service 1998; Germano and Williams 1992b; Selmon *in litt.* 2006)
- Assess potential effects of malathion upon the prey base of the blunt-nosed leopard lizard (Germano *et al.* 2007) and apply findings to the CDFA Curly Top Virus Control Program.

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Appendix A—Analysis of downlisting Criteria for Blunt-nosed Leopard Lizard 5-Year Review

Summary

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 – 640-acre parcels. Within the Ciervo-Panoche Natural Area, two ACECs separated by 2 miles protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. Within the foothills of western Kern County, the Oxy conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area , but not in the four other specified recovery areas.

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern NWR; Pixley NWR; the CNLM lands at Semitropic Ridge Preserve; the CNLM, PXP, and BLM lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM lands of the Carrizo Plain National Monument; the Coles Levee Ecosystem Preserve; and KWB Conservation Lands. Therefore, the downlisting criterion for the approval and implementation of a management plan in all protected areas is partly achieved.

Lastly, the downlisting criteria require population stability in the protected areas with the mean population density remaining above 2 per hectare through one precipitation cycle. Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR (Figure 3) while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. There is not sufficient data available at this time to determine whether the Ciervo-Panoche Natural Area or any of the other protected areas achieve the population stability criteria. Therefore, the downlisting criterion for population stability has not been achieved for any of the specified recovery areas.

Analysis of Recovery Criteria

1. *Protection of five or more areas, each about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat, as follows:*

Summary

The downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat has been achieved in the following areas:

- Foothills of the Carrizo Plain Natural Area

Whereas currently the downlisting criterion for blunt-nosed leopard lizard habitat protection has yet to be met for the following areas:

- Valley floor in Merced or Madera Counties
- Valley floor in Tulare or Kern Counties
  - *Semitropic Ridge Preserve*
  - *Kern National Wildlife Refuge*
  - *Lokern Natural Area*
  - *Buttonwillow Ecological Reserve*
  - *Coles Levee Ecological Preserve (CLEP), Kern Water Bank (KWB) Conservation Lands, and the Tule Elk State Reserve*
  - *Pixley National Wildlife Refuge*
  - *Allensworth Ecological Reserve*
- Foothills of the Ciervo-Panoche Natural Area
- Foothills of western Kern County
  - *Elk Hills Conservation Area*
  - *Naval Petroleum Reserve #2*
  - *Wind Wolves Preserve*

Assessment

Valley floor in Merced or Madera Counties
There are no large preserves in Merced or Madera Counties containing significant populations of blunt-nosed leopard lizard. The preserves in western Merced County (e.g. Grasslands Ecological Area, roughly 179,000 acres) are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.* 2006). Therefore, the downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat on the Valley floor in Merced or Madera Counties has not been met.

Valley floor in Tulare or Kern Counties
Several large preserves have been established on the Valley floor in Tulare and Kern Counties containing populations of blunt-nosed leopard lizard (Figure 2). These preserves include Semitropic Ridge Preserve, Kern National Wildlife Refuge (NWR), Lokern Natural Area, Buttonwillow Ecological Reserve (ER), Coles Levee Ecosystem Preserve, Kern Water Bank (KWB), Tule Elk State Reserve, Pixley NWR, and Allensworth ER.

Semitropic Ridge Preserve

The Semitropic Ridge Preserve currently protects about 5,278 acres—comprised of 3,093 acres administered by the Center for Natural Lands Management (CNLM), and 2,185 acres administered by CDFG—of contiguous blunt-nosed leopard lizard habitat on the Valley floor of northwestern Kern County (Cypher *in litt.* 2006, Kern County Recorder 2006, Warrick *in litt.* 2006). About 570 acres of CDFG land west of Goose Lake Canal was excluded from the calculation of contiguous lands at Semitropic Ridge because the canal acts as a barrier to blunt-nosed leopard lizard movement (Warrick *in litt.* 2006). Another 120-acre parcel is currently in escrow for the CDFG (Peterson-Diaz *in litt.* 2006), which when protected would bring the total acres of contiguous lands to 5,398 acres. Therefore, the Semitropic Ridge Preserve comes close to the 5,997-acre downlisting criterion; however, only about 1,500 acres of the preserve meet the criterion of maintaining a blunt-nosed leopard lizard population density of greater than 2 per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criteria for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties and population stability has not been met.

Kern National Wildlife Refuge

The Kern NWR is located in northwestern Kern County about 4 km (2.5 miles) north of the Semitropic Ridge Preserve. The majority of the Kern NWR is seasonally flooded and does not provide habitat for blunt-nosed leopard lizard. About 2,000 acres of Kern NWR are considered to be potential blunt-nosed leopard lizard habitat; however, there have been no confirmed sightings of blunt-nosed leopard lizard there since 1996 (Williams *in litt.* 2006). Surveys for blunt-nosed leopard lizard were conducted in the 1,369-acre Research Natural Area (Units 11 and 12) in 2001 and 2004, but none were found. In the summer of 2006, surveys were conducted in the recently acquired 631-acre Unit 15, which contains better quality blunt-nosed leopard lizard habitat than Units 11 and 12, but no blunt-nosed leopard lizard were observed there either. More intensive surveys are planned for 2007 (Williams *in litt.* 2006), though at the time of this review, results had not been obtained. Therefore, the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties has not been met.

Lokern Natural Area

The Lokern Natural Area is located in western Kern County about 23 km (14.5 miles) south of the Semitropic Ridge Preserve. Currently, 13,160 acres of the Lokern area are protected on Federal or State lands or under conservation easements. The protected Lokern lands include Bureau of Land Management (BLM) lands (3,858 acres), Center for Natural Lands Management (CNLM) lands (3,332 acres), CDFG lands (968 acres), and Plains Exploration & Production Company (PXP; 840 acres) and Occidental of Elk Hills, Inc. (Oxy; 4,162 acres) conservation lands (Service 1995; Nuevo Energy Company and Torch Operating Company 1999; Kern County Recorder 2006; Quad Knopf 2006; G. Warrick, CNLM, pers. comm. 2006). The protected lands, however, are highly fragmented into parcels ranging in size from 10 to 640 acres creating a checkerboard pattern of protected lands. The largest block of contiguous protected lands in the Lokern area is 2,882 acres of Oxy conservation lands (Elk Hills Conservation Area) at the southern end of the Lokern area on the North Flank of the Elk Hills. Therefore, the downlisting criterion for contiguous land protection the Valley floor of Kern or Tulare Counties has not been met.

Chevron USA, Inc. (Chevron), the largest landowner in the Lokern area (17,329 acres), owns the intervening 640-acre sections of the checkerboard pattern of protected lands in the Lokern Natural Area. The draft Chevron Lokern Habitat Conservation Plan (Chevron, *in prep.*, 2008) proposes to protect 11,143 acres in the Lokern area and limit permanent disturbance of its undeveloped Lokern lands to 10 percent per 640-acre section, and temporary disturbance to an additional 5 percent. In total approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. On August 17, 2006, Chevron reasserted its commitment to complete the proposed HCP and proceed with acquiring and/or protecting the proposed habitat lands (G. Scott, Chevron, pers. comm. 2006). Still, until the HCP is finalized the habitat loss and protection associated with the proposed HCP remains speculative.

Buttonwillow Ecological Reserve

The Buttonwillow ER is located in western Kern County about 21 km (13 miles) southeast of the Semitropic Ridge Preserve and 16 km (10 miles) east-northeast of the Lokern Natural Area. The Buttonwillow ER protects about 1,350 acres of contiguous blunt-nosed leopard lizard habitat. Buttonwillow ER contains one of the largest and most stable blunt-nosed leopard lizard populations (Selmon *in litt.* 2006). Due to the small size of the preserve, however, the Buttonwillow ER does not meet the downlisting criterion for contiguous land protection.

Coles Levee Ecological Preserve, Kern Water Bank Conservation Lands, and the Tule Elk State Reserve

The 6,059-acre Coles Levee Ecosystem Preserve (CLEP), 4,263-acre Kern Water Bank (KWB) Conservation Lands, and 969-acre Tule Elk State Reserve are contiguous protected areas in western Kern County located east of the Elk Hills. However, blunt-nosed leopard lizard movement among and within the three preserves is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119.

The California Aqueduct bisects the CLEP creating a barrier to blunt-nosed leopard lizard movement and partitioning the preserve into about 1,280 acres to the west and 4,779 acres to the east. Additionally, portions of the CLEP are highly disturbed by high-density oil and gas drilling activities. Although the permit for CLEP HCP (ARCO Western Energy 1995) is not currently valid—as the current land owner, Aera Energy LLC, failed to initially comply with the terms of the HCP—the area is still managed according to its initial conservatory intent. Notably, no blunt-nosed leopard lizards have been observed at CLEP in recent years (Quad Knopf 2005; J. Jones, Quad Knopf, pers. comm. 2006).

Interstate 5 acts as a barrier to blunt-nosed leopard lizard movement and divides the KWB Conservation Lands into 2,589-acre and 1,674-acre parcels (Jones *in litt.* 2006).

The KWB Conservation Lands are protected under the KWB Authority HCP (KWB Authority 1996) and associated biological opinion (Service 1997). However, there are no records of blunt-nosed leopard lizard on the KWB Conservation Lands except for blunt-nosed leopard lizard introductions (Jones *in litt.* 2006, KWB Authority 2006). Although protocol-level blunt-nosed leopard lizard surveys have not been conducted on the KWB lands, these lands have had numerous other reconnaissance and meandering surveys over the years. Given the repetitive negative results from all of these surveys, the blunt-nosed leopard lizard is considered absent from the area (Jones *in litt.* 2006).

Therefore, due to the lack of blunt-nosed leopard lizard sightings and the barriers to blunt-nosed leopard lizard movement among and within the three preserves—Coles Levee Ecological Reserve, Kern Water Bank Conservation Lands, and Tule Elk State Reserve—the downlisting criterion for the Valley floor of Kern or Tulare Counties.

Pixley National Wildlife Refuge
The 6,833-acre Pixley NWR in southwestern Tulare County is divided into three large sections and several smaller sections; all parcels, with one exception, are separated by at least 1.6 km (1 mile). The largest section (Pixley-Main) covers 4,445 acres, but less than 3,000 acres are considered suitable habitat for blunt-nosed leopard lizard due to seasonal flooding of the wetlands and dense vegetative growth. The second largest section (Los Feliz) is roughly 1,476 acres. Very little reconnaissance has been done in this area, however given that the entire area is grazed it is speculatively considered potential blunt-nosed leopard lizard habitat as suitable vegetation conditions may be present. The third largest section (Horse Pasture) contains 800 acres of potential blunt-nosed leopard lizard habitat although the presence of blunt-nosed leopard lizard has not been documented (Williams *in litt.* 2006). In summary, the largest contiguous block of blunt-nosed leopard lizard habitat at Pixley NWR is 3,000 acres; thus, this downlisting criterion has not been met.

Allensworth Ecological Reserve
The Allensworth ER is owned by CDFG and located in southwestern Tulare County. This ER contains four large blocks of land containing suitable habitat for the species. However, the blocks are separated from each other and do not form contiguous habitat as required by this downlisting criterion. The largest block totals 2,482 acres and is not large enough by itself to meet the recovery goal of 5,997 acres of contiguous blunt-nosed leopard lizard habitat. In addition, the blunt-nosed leopard lizard population at Allensworth Ecological Reserve has been declining over the past 15 years (Selmon, pers. comm. 2006). Therefore, this recovery criterion has not been met for the Valley floor of Kern or Tulare Counties.

The sizes of the blocks are 2,482 acres, 1,432 acres, 551 acres, and 536 acres. The largest block is located about 3 km (1.9 miles) southeast of the Pixley-Main section of the Pixley NWR. The second largest and southernmost block is located about 5 km (3.1 miles) southwest of the largest block and about 18 km (11.2 miles) northeast of Kern NWR. Habitat planning goals include connecting the blocks of natural lands at Allensworth ER with Pixley NWR through land acquisition and retirement of agricultural fields; however, Deer Creek acts a barrier to blunt-nosed leopard lizard movement along the southern boundary of Pixley-Main (P. Williams, Kern NWR Complex, pers. comm. 2006). The number of blunt-nosed leopard lizards at Allensworth ER has also declined over the past 15 years (Selmon *in litt.* 2006). In summary, the largest block at Allensworth ER is 2,482 acres and is not sufficient to meet this downlisting criterion for the Valley floor of Kern or Tulare Counties.

Foothills of the Ciervo-Panoche Natural Area

The BLM owns about 34,000 acres in the Ciervo-Panoche Natural Area that are considered to be blunt-nosed leopard lizard habitat (Lowe 2006). However, only the Areas of Critical Environmental Concern (ACECs) have regulatory protection under the Federal Land Policy and Management Act of 1976. The BLM allows oil and gas leasing with limited surface use stipulations for threatened and endangered species on the four ACECs (BLM 1984, 1997) and thus confer some protection to approximately 16,600 acres of blunt-nosed leopard lizard habitat (Terry 2006).

Some of the best blunt-nosed leopard lizard habitat in the region, however, remains unprotected on private lands in the Panoche Valley and near Silver Creek. Only 3 of the 21 (14 percent) reported occurrences of blunt-nosed leopard lizard are within an ACEC (CNDDB 2006; Lowe *in litt.* 2006). Much of the rest of the Ciervo-Panoche Natural Area is not suitable habitat for blunt-nosed leopard lizard due to dense vegetative cover and clay soils (Lowe *in litt.* 2006; L. Saslaw, pers. comm. 2006). Since the largest protected block of blunt-nosed leopard lizard habitat is 4,800 acres, it does not meet this downlisting criterion for the foothills of the Ciervo-Panoche Natural Area.

Foothills of western Kern County

The foothills of western Kern County contain blunt-nosed leopard lizard habitat on both public and private lands. Protected areas and other public lands containing blunt-nosed leopard lizard habitat occur in the Elk Hills, Naval Petroleum Reserve #2 (NPR-2), and the Wind Wolves Preserve.

Elk Hills Conservation Area

The Oxy conservation lands (Elk Hills Conservation Area) consist of 4,162 acres on the North Flank of the Elk Hills near Lokern and another 3,770 acres in the Buena Vista Valley (Buena Vista Valley) along the southern edge of the Elk Hills. Within the North Flank, only 2,882 acres (mentioned above in the Lokern Natural Area) are contiguous. All 3,770 acres of the Oxy conservation lands in the Buena Vista Valley area are contiguous (Quad Knopf 2006) but are not sufficient to meet this downlisting requirement.

Currently, Oxy has proposed an Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) that would permit an additional permanent disturbance of up to 4,000 acres and temporary disturbance of up to 3,000 acres within Elk Hills for oil and gas development. The HCP proposes to preserve 81.8 percent (roughly 38,780 acres) of the 47,409-acre Elk Hills NPR-1 (Live Oak & Associates, Inc., *in litt.* 2009). Until the HCP is finalized and the Service issues the incidental take permit, habitat loss and protection associated with the proposed HCP is speculative.

Naval Petroleum Reserve #2
The BLM owns approximately 9,000 acres in NPR-2 and Buena Vista Valley, mostly in a checkerboard of 640-acre parcels. In 2003 the Service programmatic biological opinion (#1-1-01-F-0063) which covered oil and gas extraction activities on BLM lands was amended to include NPR-2 (Service 2003). However, even though the limits disturbance of high quality habitat (Red Zone Lands) to less than 10 percent per 640-acre section and lower quality habitat (Green Zone Lands) to less than 25 percent (Service 2001), residual habitat on BLM lands has been degraded by past oil and gas exploration activities. Unfortunately, several sections within NPR-2 had already exceeded the disturbance thresholds when the BLM acquired the properties. The biological opinion also limits total permanent disturbance of blunt-nosed leopard lizard habitat on BLM lands throughout Kings and Kern Counties to 180 acres (Service 2001, 2003). Since the BLM lands at NPR-2 are highly fragmented they do not meet the downlisting criterion for the foothills of western Kern County.

Wind Wolves Preserve
About 2,000 acres of potential blunt-nosed leopard lizard habitat is protected on the edge of the large Wind Wolves Preserve. Wildlands Conservancy, a non-profit group, purchased this southwestern Kern County site in 2001. In the early 1990s a blunt-nosed leopard lizard sighting was reported in the Preserve at Rincon Flat near Interstate 5 (CNDDB 2006). However, no blunt-nosed leopard lizards have been observed on the Preserve since that initial report. The 2,000 acres of potential blunt-nosed leopard lizard habitat do not meet the downlisting criterion for the foothills of western Kern County.

Foothills of the Carrizo Plain Natural Area
The 250,000-acre BLM Carrizo Plain National Monument and adjacent CDFG Ecological Reserve protect blunt-nosed leopard lizard populations on the Carrizo Plain Natural Area (about 55,000 acres) and roughly 1,000 acres of the Upper Cuyama Valley (Saslaw *in litt.* 2006). These lands meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat in the foothills of the Carrizo Plain Natural Area.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

Summary

The downlisting criterion for an approved and implemented management plan that includes the continued survival of blunt-nosed leopard lizard as an objective has been met for the following protected areas:

- CNLM lands of the Semitropic Ridge Preserve

- CNLM, PXP, and BLM lands of the Lokern Natural Area
- Oxy lands of the Elk Hills Conservation Area
- Kern and Pixley NWRs
- BLM Hollister RMP
- BLM, TNC, and CDFG lands of the Carrizo Plain National Monument

All other protected areas, including CDFG lands of the Semitropic Ridge, California State Parks Tule Elk State Reserve, Buttonwillow Ecological Reserve Allensworth Ecological Reserve, and Wind Wolves Preserve have not currently been drafted, or do not include the continued survival of the blunt-nosed leopard lizard as an objective. A joint-management plan for the Carrizo Plain Natural Area—Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered by the Nature Conservancy (TNC)—and, the Caliente RMP are also currently being revised. Therefore, the downlisting criterion is only partly met.

Assessment

The CNLM lands of the Semitropic Ridge Preserve and Lokern Natural Area have an approved management plan with a management goal to "prevent the extinction of threatened and endangered species through maintenance of high quality native habitat which supports viable, self-sustaining populations" (Warrick *in litt.* 2006). The Semitropic Ridge Preserve is grazed by sheep to control exotic grasses but the grazing is not very effective during unusually wet years (Warrick *in litt.* 2006). None of the CDFG lands currently have an approved management plan (E. Cypher, pers. comm. 2006; S. Juarez, CDFG, pers. comm. 2006). CDFG does not have any grazing leases for its lands at Semitropic Ridge but would like to at some point (Warrick *in litt.* 2006). Therefore, the criterion has been met for the CNLM lands at Semitropic Ridge and Lokern but not for the CDFG lands.

The Kern NWR and Pixley NWR both have management plans that include the survival of blunt-nosed leopard lizard as an objective. The 1,369-acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*). Approximately 2,890 acres of Pixley-Main has been designated as endangered species habitat. All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006). Therefore, this criterion has been met for the Kern and Pixley NWRs.

The Caliente Resource Management Plan (RMP) (BLM 1997) covers all BLM lands under the jurisdiction of the Bakersfield field office, but not the more recently acquired NPR-2 lands. The management plan includes the survival of listed species including blunt-nosed leopard lizard as an objective. The BLM is currently revising its Caliente RMP. The new RMP will include NPR-2 and will also provide measures for the protection of the blunt-nosed leopard lizard (L. Saslaw, BLM, pers. comm. 2006). Therefore, the downlisting criterion has been met for the BLM lands under the jurisdiction of the Bakersfield office, except for NPR-2.

The Carrizo Plain Natural Area Management Plan (BLM 1996) established the cooperative management of the 250,000 acres within the Carrizo Plain Natural Area, comprised of: the Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered

TNC. This joint-management plan includes measures for the protection of blunt-nosed leopard lizard. The BLM is currently preparing the Carrizo Plain National Monument RMP that will specifically address management of the Carrizo Plain National Monument (L. Saslaw, pers. comm. 2006). The draft RMP and Environmental Impact Statement (EIS) are currently in preparation, and are expected to be available for public review in fall 2009. Concurrently CDFG is revising its management plan for the protection of blunt-nosed leopard lizard within the Carrizo Plain ER (Stafford *in litt.* 2007). Based on the approval and implementation of the pending revision for the joint-management plans of the Carrizo Plain Natural Area, the downlisting criterion has been met for the BLM, CDFG, and TNC lands of the Carrizo Plain National Monument.

Service biological opinion (file number 1-8-07-F-19) for the revised Hollister RMP was issued in June 2007 (Service 2007), and the RMP was finalized on September 7, 2007. This plan established resource management goals for areas where blunt-nosed lizard habitat was known or had potential to occur, including: the Panoche Hills management unit has approximately 7,800 acres of habitat for sensitive species in the plateau area; and, the Griswold/Tumey Hills management unit includes 2,500 acres of habitat areas for sensitive species in the plateau area in the northern Tumey Hills. Blunt-nosed leopard lizards have been observed on private lands adjacent to the Tumey Hills management unit in the eastern Panoche valley. Lastly, the Coalinga management unit has 14,660 acres designated for sensitive species, including the blunt-nosed leopard lizard. Given BLM's commitment to implement the resource management goals, the biological opinion permitted BLM to take blunt-nosed leopard lizards or impact its habitat by conducting its grazing management, energy and minerals program, vegetation management program, and transportation program. The Hollister RMP therefore achieves this downlisting criterion.

Oxy is currently managing its 7,801 acres of conservation lands (Elk Hills Conservation Area) in Lokern and the Buena Vista Valley for the survival of blunt-nosed leopard lizard and other listed species in accordance with the Elk Hills biological opinion (Service 1995) and the 1998 Conservation Management Agreement. Also within the Elk Hills area, Berry Petroleum was authorized under the North Midway Sunset biological opinion (Service 2006) to develop a management plan that includes the survival of blunt-nosed leopard lizard as an objective for its 1,725 acres of conservation lands in Lokern, Buena Vista Valley, and Midway Valley. Therefore, the downlisting criterion has been met for the Elk Hills Conservation Area, but not yet for the Berry Petroleum lands.

The PXP, Coles Levee, and KWB Authority HCPs contain management plans which include the survival of blunt-nosed leopard lizard as an objective in the Lokern Natural Area, Coles Levee Ecosystem Preserve, and KWB Conservation Lands, respectively (ARCO Western Energy 1995; KWB Authority 1996; Nuevo Energy Company and Torch Operating Company 1999). Less than one-fourth of the KWB Conservation Lands, however, are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006). Chevron and Oxy are currently preparing HCPs for their lands in the Lokern area and Elk Hills, respectively; however, it is unknown when the HCPs will be finalized and approved. Additionally, no management plans have been implemented for blunt-nosed leopard lizard habitat on private lands in the Ciervo-Panoche Natural Area and in western Kern County.

Therefore, the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective has been met for the PXP conservation lands in Lokern but not for the Chevron or Oxy lands (outside of the Elk Hills Conservation Area).

In the Lokern area, an interagency cooperative acquisition and management plan for the conservation of the 44,000-acre Lokern Natural Area is in draft form. Participants include Federal agencies (BLM, Service), State agencies (CDFG, California Energy Commission, California State University Bakersfield), private environmental groups and biological consulting firms (The Nature Conservancy [TNC], CNLM, ESRP, McCormick Biological, Inc.), and private oil companies (Chevron; Oxy; Aera Energy, LLC [Aera]; PXP) (Service 1998). The parties periodically meet to coordinate their efforts, but there is no estimate for when the Lokern Natural Area management plan will be approved and implemented. Therefore outside of the CNLM and PXP conservation lands, the recovery criterion has not been met for the Lokern Natural Area.

In summary, only the CNLM lands of the Semitropic Ridge Preserve, the CNLM, PXP, and BLM lands of the Lokern Natural Area, the Oxy lands of the Elk Hills Conservation Area, the Kern and Pixley NWRs, and the BLM, TNC, and CDFG lands of the Carrizo Plain National Monument have a management plan for blunt-nosed leopard lizard that has been approved and implemented. The management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion is only partly met.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle*.

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004, Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005, Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley NWR (ESRP, Williams *in litt.* 2006), Buttonwillow ER, and Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). However, long-term population studies have not been conducted for blunt-nosed leopard lizard in the Cuyama Valley, the Ciervo-Panoche area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

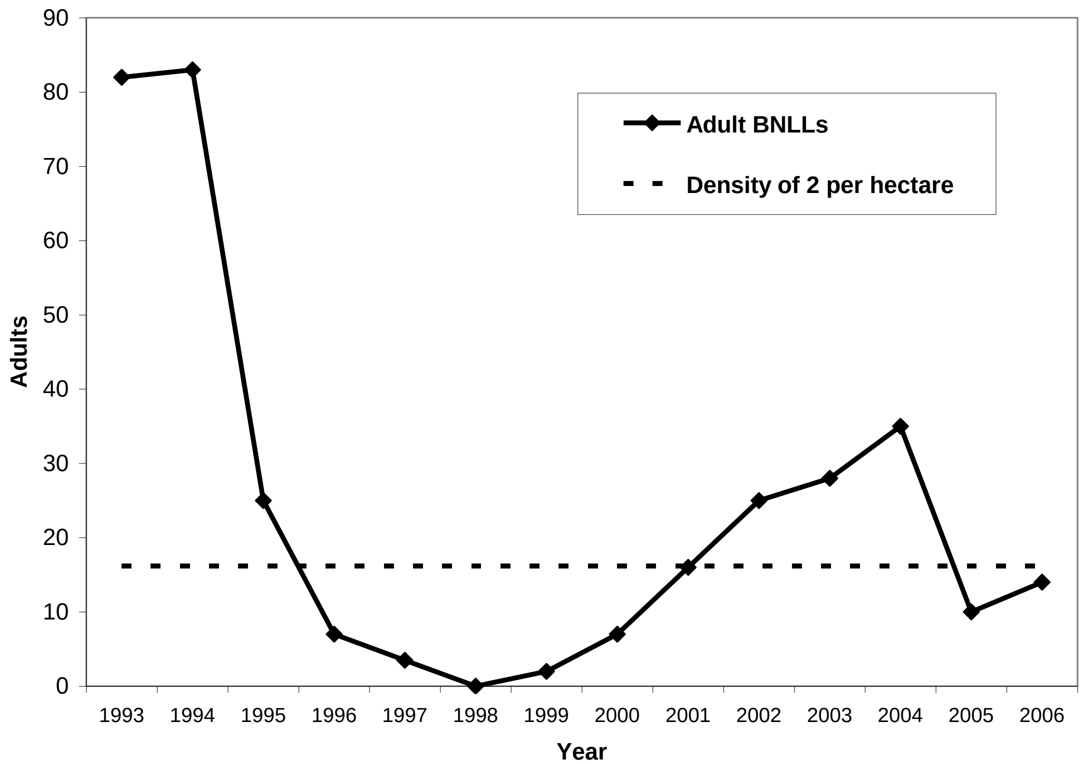
Pixley NWR

Figure 3 illustrates the population instability of blunt-nosed leopard lizard at Pixley NWR. Spring surveys of adult blunt-nosed leopard lizards from 1993 to 2006 show that the density was below 2 per hectare from 1996 to 2000 during years of above average precipitation. No blunt-nosed leopard lizards were found during surveys in 1998 due to flooding. Blunt-nosed leopard lizard numbers increased from 2001 to 2004 during years of below average precipitation but declined again below 2 per hectare during the wet years 2005 to 2006. Previous short-term studies observed blunt-nosed leopard lizard population densities at Pixley NWR of 0.3 to 10.8 per hectare (Uptain *et al.* 1985), 3.3 per hectare (Tollestrup 1979), and 6.7 to 7.0 per hectare (Williams and Germano 1991). In summary, due to the decline in blunt-nosed leopard lizard numbers during wet years, this downlisting criterion has not been met at Pixley NWR.

Elkhorn Plain

ESRP has monitored population trends of blunt-nosed leopard lizards on the Elkhorn Plain biannually since 1989 (Williams *et al.* 1993; Germano *et al.* 2004; Germano and Williams 2005). From 1989 to 1994, the population density ranged from 4.9 to 20.2 adults per hectare, except for 1990 when the density decreased to 1.7 adults per hectare following two years of severe drought. Then, after several years of above average precipitation, the population density of blunt-nosed leopard lizard decreased in 1995 and remained between 1.7 to 4.9 adults per hectare through 2003. The density remained below 1.8 adults per hectare during the wettest years from 1998 to 2000. Therefore, due to the decline in blunt-nosed leopard lizard numbers during consecutive wet years or years of severe drought, this downlisting criterion has not been met on the Elkhorn Plain.

Figure 3, The number of adult blunt-nosed leopard lizards observed during spring surveys on the Deer Creek West 20-acre plot, Pixley National Wildlife Refuge, Tulare County (Source: ESRP, Williams *in litt.* 2006)



Kern County Valley floor
The largest and most stable population of blunt-nosed leopard lizard is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 (Selmon *in litt.* 2006). At Semitropic Ridge Preserve, road surveys during May and June, 2005, found an average of 6 blunt-nosed leopard lizards per 32-km (20-mile) survey (Warrick 2006), which is far below the criterion for 2 blunt-nosed leopard lizards per hectare. Road surveys, however, are likely overestimates of blunt-nosed leopard lizard population density in an area because of the preference of the species for roads (Warrick *et al.* 1998; Warrick *in litt.* 2006). Additionally, the land manager at Semitropic Ridge Preserve stated that only about 1,500 acres of the preserve comes close to supporting a population density of 2 blunt-nosed leopard lizards per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the Semitropic Ridge Preserve. No population density estimates are available at this time for Buttonwillow ER. Blunt-nosed leopard lizard numbers at Allensworth ER are reported to have declined over the past 15 years (Selmon *in litt.* 2006), but no data are available at this time.

At Lokern, road surveys in May and June, 2005, observed an average of 32.7 blunt-nosed leopard lizards per 82-km (51-mile) survey (Warrick 2006). Therefore, the population density estimate—ranging from 0.40 to 1.33 blunt-nosed leopard lizards per hectare—is well below the recovery criterion (Warrick *in litt.* 2006). Additionally, grazed and ungrazed plots on the Lokern were surveyed annually between 1997 to 2005, using a 10-day census survey method. These results indicated that the density of blunt-nosed leopard lizards on ungrazed plots remained less than 0.5 per hectare (notably according to Germano *et al.* (2005) no blunt-nosed leopard lizards were observed during 2000 – 2003); and, densities on grazed plots ranged from 0.06 – 0.25 per hectare during 1997 to 2001, and increased to 0.46 – 1.50 per hectare during 2002 to 2005 (Germano *et al.* 2005). Nonetheless, the downlisting criterion has not been met at Lokern.

At Coles Levee Ecosystem Preserve, blunt-nosed leopard lizard surveys have been conducted annually from 1996 to 2004 (Quad Knopf 2005). Only 10 blunt-nosed leopard lizards were observed during the surveys and no blunt-nosed leopard lizards have been observed in the last three years (Quad Knopf 2005). However, incidental observations of blunt-nosed leopard lizards are occasionally made during other monitoring activities (Quad Knopf 2005). Therefore, the downlisting criterion has not been met at Coles Levee Ecosystem Preserve.

At the KWB Conservation Lands, no protocol-level surveys for blunt-nosed leopard lizards have been conducted and the species has not been observed on numerous reconnaissance and meandering surveys over the years. Thus, the population density is most likely well below 2 blunt-nosed leopard lizards per hectare (Jones *in litt.* 2006; Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the KWB Conservation Lands.

Elk Hills Conservation Area
At a site near the Elk Hills Conservation Area, blunt-nosed leopard lizard population density was previously estimated at 0.40 adults per hectare (Kato *et al.* 1987). More recently, blunt-nosed leopard lizard population trends have been monitored in spring and early fall by means of road and foot surveys from 2001 to 2005 in the North Flank and Buena Vista Valley lands of the Elk Hills Conservation Area (Quad Knopf 2006). Population density estimates from 2000 - 2005—

calculated from the average sightings per mile of road survey (with a width of 50 meters)—remained below 0.02 blunt-nosed leopard lizards per hectare in both the North Flank and Buena Vista Valley (J. Jones, Quad Knopf, Inc., pers. comm. 2006). Foot surveys conducted during the same time periods, supported these low observation numbers, and reported 0.01 blunt-nosed leopard lizards per hectare in the North Flank and from 0.01 – 0.07 blunt-nosed leopard lizards per hectare in Buena Vista Valley. Therefore, due to the continually low densities observed in the North Flank and in Buena Vista Valley, the downlisting criterion has not been met at the Elk Hills Conservation Area.

Delisting Criteria

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

1) *Three additional areas with about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat including:*
   A) *One on the Valley floor;*
   B) *One along the western Valley edge in Kings or Fresno Counties; and*
   C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.*
2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Other Valley Floor

The protection of blunt-nosed leopard lizard habitat on the Valley floor in Kern and Tulare Counties and in Merced and Madera Counties is discussed above in the above section on the Downlisting Criteria. None of the protected areas meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor in these areas. Therefore, the delisting criterion has also not been met.

Western Valley edge in Kings or Fresno Counties

Alkali Sink Ecological Reserve

The Alkali Sink ER protects 933 acres of alkali sink scrub and Valley annual grasslands blunt-nosed leopard lizard habitat in northwestern Fresno County (Figure 2). The purpose of the Alkali Sink ER Interim Management Plan (Ashford 1990a) is to preserve the remaining Alkali Sink Scrub habitat type, protect habitat for the Fresno kangaroo rat and blunt-nosed leopard lizard from agricultural conversion. There are no population data available at Alkali Sink ER at this time. The 12,000-acre Mendota Wildlife Area is located immediately to the south of the Alkali Sink ER. However, over two-thirds of the Wildlife Area are seasonally flooded and do not support blunt-nosed leopard lizard habitat. No blunt-nosed leopard lizards have been observed at the Mendota Wildlife Area (S. Juarez, CDFG, pers. comm. 2006). Therefore, the Alkali Sink ER and Mendota

Wildlife Area do not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kerman Ecological Reserve
The Kerman ER is located about 5 miles east of the Mendota Wildlife Area and protects 1,718 acres of Valley Annual Grasslands in northwestern Fresno County (Figure 2). In the Kerman ER Interim Management Plan (Ashford 1990b), protection of Fresno kangaroo rat and blunt-nosed leopard lizard habitat is the principal management focus. Livestock grazing is occasionally permitted to control exotic grasses. Hunting is allowed but vehicles are restricted to roads. There is no population data available for Kerman ER. Therefore, due to its small size, the Kerman ER does not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kreyenhagen Hills Conservation Bank
The 1,295-acre Kreyenhagen Hills Conservation Bank is located in the foothills of southwestern Fresno County. The conservation bank was established by Wildlands, Inc. for providing mitigation credits for impacts to San Joaquin kit fox (*Vulpes macrotis mutica*) habitat in portions of Fresno and Kings Counties. No blunt-nosed leopard lizards have been observed there (Lopez *in litt.* 2006; Warrick *in litt.* 2006); however, the site has numerous washes that could provide suitable habitat for the species (Lopez *in litt.* 2006). There is one reported occurrence of blunt-nosed leopard lizard approximately one mile off-site within the Jacalitos Creek Watershed (CNDDB 2006, Lopez *in litt.* 2006). In summary, due to the small size of the preserve and lack of sightings of blunt-nosed leopard lizard, the Kreyenhagen Hills Conservation Bank does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

Kettleman Hills Area of Critical Environmental Concern
The BLM's Kettleman Hills ACEC consists of 6,730 acres within the Kettleman Hills of western Kings County. The BLM lands, however, are mostly in a checkerboard pattern of 640-acre and smaller parcels. It is not known how much of the ACEC supports blunt-nosed leopard lizard. The Caliente RMP (BLM 1997) covers the ACEC and meets the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. However, due to the highly fragmented nature of the protected lands, the Kettleman Hills ACEC does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

<u>Upper Cuyama Valley</u>
About 1,000 acres of blunt-nosed leopard lizard habitat is protected on the southern edge of the Carrizo Plain National Monument and Ecological Reserve (Saslaw *in litt.* 2006). Most of the rest of the Cuyama Valley, however, is unprotected on private lands and has been degraded by farming activities. There is no population data for blunt-nosed leopard lizard in Cuyama Valley but the populations are likely decreasing there due to an increasing amount of habitat conversion to intensive irrigated agriculture (Stafford *in litt.* 2006). Therefore, due to the lack of population monitoring data and the lack of protection of sufficient habitat, the delisting criteria for the upper Cuyama Valley have not been met.

Appendix B: Habitat Conservation Plans related to the Blunt-Nosed Leopard Lizard and Biological Opinions

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permit included take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs are summarized in Table 4 in the review. Effectively through the HCP process 89,288 acres of habitat land has been conserved, while a total 30,052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary assessment of issued biological opinions from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard. Of these activities, the greatest amount of habitat disturbance authorized were for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB 6,000 acres permanent), and other agricultural, residential, and commercial development activities (MBHCP 15,200 acres permanent).

Details of 11 of the HCPs affecting the blunt-nosed leopard lizard are discussed below.

1. The ARCO Western Energy Coles Levee HCP (currently managed by Aera) authorizes the permanent disturbance of 330 acres of natural lands including 270 acres of blunt-nosed leopard lizard habitat (ARCO Western Energy 1995). Mitigation for the disturbance is the preservation of 990 acres through the 6,059-acre Coles Levee Ecological Reserve conservation bank.

2. The Coalinga Cogeneration HCP (Aera Energy and Chervon 1991) authorizes the permanent disturbance of 49.6 acres and temporary disturbance of 27.6 acres of blunt-nosed leopard lizard habitat in the oilfield near Coalinga in southwestern Fresno County. Mitigation for the project is the protection of 179 acres of blunt-nosed leopard lizard habitat near the site. On June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.

3. The California Department of Corrections Delano Prison HCP (California Department of Corrections 1991) authorizes the permanent disturbance of 287 acres and temporary disturbance of 348 acres of blunt-nosed leopard lizard habitat near Delano in northern Kern County. Mitigation for the project is the enhancement and revegetation of 348 acres of blunt-nosed leopard lizard habitat on-site and the acquisition of 514 acres of blunt-nosed leopard lizard habitat for protection within the Allensworth ER.

4. The California Department of Corrections Statewide Electrified Fence Project HCP authorizes the incidental take of up to 2 blunt-nosed leopard lizards by electrocution at eight

state prisons in a 5-year period during the 50-year duration of the permit (EDAW 1999). Mitigation for impacts to blunt-nosed leopard lizard includes acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and the acquisition and enhancement of an additional 800 acres of low quality laser-leveled farmland at Allensworth ER. However, at this time it is not known whether the restoration of farmland to native habitat will benefit the blunt-nosed leopard lizard. A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003). The major components of the plan include: acquisition of 200 acres of privately-owned land next to the existing reserve boundary; installation of protective fencing and seasonal grazing to reduce non-native annual grass cover (as needed) on the newly acquired land; and patrol and maintenance of fences, monitoring of sensitive population trends, trash removal, and management of grazing leases on the existing reserve lands. As of June 11, 2006, the Wildlife Conservation Board (WCB) had identified two potential parcels for acquisition and was pursuing state-required appraisals prior to escrow. However, due to hesitation on the part of the sellers, CDFG and WCB have identified potential alternative acquisitions to satisfy the mitigation requirement (EDAW 2006).

5. The Chevron Pipeline HCP authorizes the temporary disturbance of 25.5 acres of blunt-nosed leopard lizard habitat in the 27G Pipeline Replacement Project (Chevron Pipeline Company 1995). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 28 acres of blunt-nosed leopard lizard habitat within Chevron's Lokern lands.

6. The Granite Construction Phase I HCP authorizes the permanent disturbance of 54 acres of blunt-nosed leopard lizard habitat for quarrying activities near Coalinga in Fresno County (Granite Construction, Inc. 1993). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 162 acres of blunt-nosed leopard lizard habitat within the Northern Semitropic Ridge ER.

7. The Kern County Waste Facilities HCP authorizes the permanent disturbance of 251 acres of natural lands including 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres of blunt-nosed leopard lizard habitat near Taft in Kern County (Kern County Waste Management Department 1997). Mitigation for impacts to blunt-nosed leopard lizard and other listed species is the protection of 755 acres of habitat at Coles Levee Ecosystem Preserve.

8. The KWB Authority HCP authorized the permanent disturbance of 12,081 acres and temporary disturbance of 291 acres of blunt-nosed leopard lizard habitat in Kern County for up to 75 years. Within the 19,900 acre-KWB, 5,900 acres are for routine recharge activities, 481 acres are for permanent water banking facilities, 960 acres are for plant preserves, 5,592 acres between the water basins will be allowed to revert to habitat, 530 acres are mitigation for the Department of Water Resources projects, 3,170 acres are for farming, and 3,267 acres are for conservation banking for third parties (490 acres of which KWB Authority may use for commercial development). Therefore, 4,263 acres of potential blunt-nosed leopard lizard habitat are protected by the KWB Authority HCP.

9. The Metropolitan Bakersfield HCP (MBHCP) and associated biological opinion (Service 1994) covers an area of 408 square miles around Bakersfield, California. The MBHCP allows the permanent disturbance of 15,200 acres of natural lands but does not estimate how much blunt-nosed leopard lizard habitat would be disturbed. The MBHCP states that mitigation for impacts to natural lands is 3:1 and for impacts to open lands (i.e. agricultural lands) is 1:1. However, the MBHCP does not explicitly state that impacts to a listed species must be mitigated for by the acquisition of lands that support the species. About 1,176 acres of blunt-nosed leopard lizard habitat disturbance has been authorized thus far through the MBHCP (Strait *in litt.* 2006); it is not known at this time how much of the habitat acquired as mitigation through the MBHCP supports blunt-nosed leopard lizard.

10. The Nuevo Torch HCP (currently managed by PXP) authorizes the permanent disturbance of 850 acres of blunt-nosed leopard lizard habitat (Nuevo Energy Company and Torch Operating Company 1999). Thus far, an 840-acre conservation easement in the Lokern area is currently being established as mitigation (R. Garcia, PXP, pers. comm. 2006).

11. The California Aqueduct HCP is currently in draft form. The area covered by the HCP includes seven pumping plants, two maintenance centers, and roughly 121 miles of Aqueduct and ROW within 11,816 acres of Kings and Kern Counties. Impacts from project related activities permitted under the HCP could total up to 1,295 acres—895 acres of impact by DWR, 290 acres of impact by third party water contractors, and an additional 110 acres of impact by other third party activities. Notably, the HCP only provides compensation for impacts by DWR and third party water contractors. Compensation for impacts associated with other third parties entering into a Compliance Agreement under the HCP will be provided via off-site compensation land consistent with Wildlife Agency requirements and subject to their approval prior to the initiation of the impacts. Compensation will be achieved through a combination of two approaches: 1) adaptive management of ROW lands to provide suitable habitat for listed species, and; 2) the conservation of three large blocks of habitat near the Buena Vista Pumping Plant, Teerink Pumping Plant, and Chrisman Pumping Plant. Thus, terms and conditions described within the HCP require DWR to manage 3,474 acres of on-site ROW land to minimize impacts to covered species to the maximum extent practicable. While total compensation acreage provided shall be 817 acres, which can be partitioned into: 242 acres of compensation for past completed emergency consultations; and, 567 acres as compensation for HCP covered activities and impacts

In addition to HCPs, numerous biological opinions have authorized disturbance of blunt-nosed leopard lizard habitat. In some earlier cases no compensation was required. For example, the biological opinion for the Laidlaw Environmental Services, Inc. hazardous waste disposal facility (Service 1988) authorized the permanent disturbance of 320 acres of blunt-nosed leopard lizard habitat in the Lokern area without requiring any compensation. In most cases, however, compensation was set at a ratio of 3:1 for permanent disturbance of natural lands.

In summary, the HCP process has facilitated the conservation of 89,288 acres of habitat land has been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary assessment of issued biological opinions under section 7 of the Act from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

Blunt-Nosed Leopard Lizard (*Gambelia sila*)

Current Classification ____Endangered____

Recommendation resulting from the 5-Year Review

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
__X__ **No change is needed**

Review Conducted By __Sacramento Fish and Wildlife Office Staff__________

FIELD OFFICE APPROVAL FOR REGION 8:

Lead Field Supervisor, Fish and Wildlife Service

Approve ______________________ Date 2.16.10

Lead Field Supervisor, Cooperating Field Office, Fish and Wildlife Service

Concur Diane K. Noda______________ Date 2/12/10

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

22 September 2010

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Cupertino, CA 95014

Preliminary Write-up of Golden Eagle Non-Breeding Season Surveys and Raptor Survey

Helicopter-based golden eagle (*Aquila chryseatos*; GOEA) surveys were conducted under the supervision of raptor biologist Pete Bloom and flown for a few days beginning on 5 August 2010 during a non-breeding period. Survey were specifically targeted for GOEA occupancy via individual and nest sightings according to the *U.S. Fish and Wildlife Service Interim Guidelines for Golden Eagle Surveys*. Blue Sky Helicopters of Redlands, CA flew two biologists (Pete Bloom and Scott Thomas) over the site and within a 10-mile radius of the site. During the flight, one biologist observed at all times while the other recorded and marked data when appropriate. Two GPS units, one primary and one backup, were used to document geographic locations of importance and the routes taken; these coordinates were also entered in field notes, and mapped by Live Oak Associates, Inc. (LOA)(Figure 1)

Fifteen GOEA nests were observed within the 10-mile radius of the Project site. Four of those nests showed evidence of having young fledged this year. No GOEA nests occurred within 2 miles of the project boundary.

The raptor species observed are included in Table 1. Photos of observed individuals are available from LOA upon request.

Table 1. Raptor species' nest and/or individuals observed during GOEA flight survey, 2010.

Species	Number of Nests/Individuals
Turkey vulture	1
Red-tailed hawk	24
Golden eagle	15
Prairie falcon	17
Common barn owl	1
Great-horned owl	1

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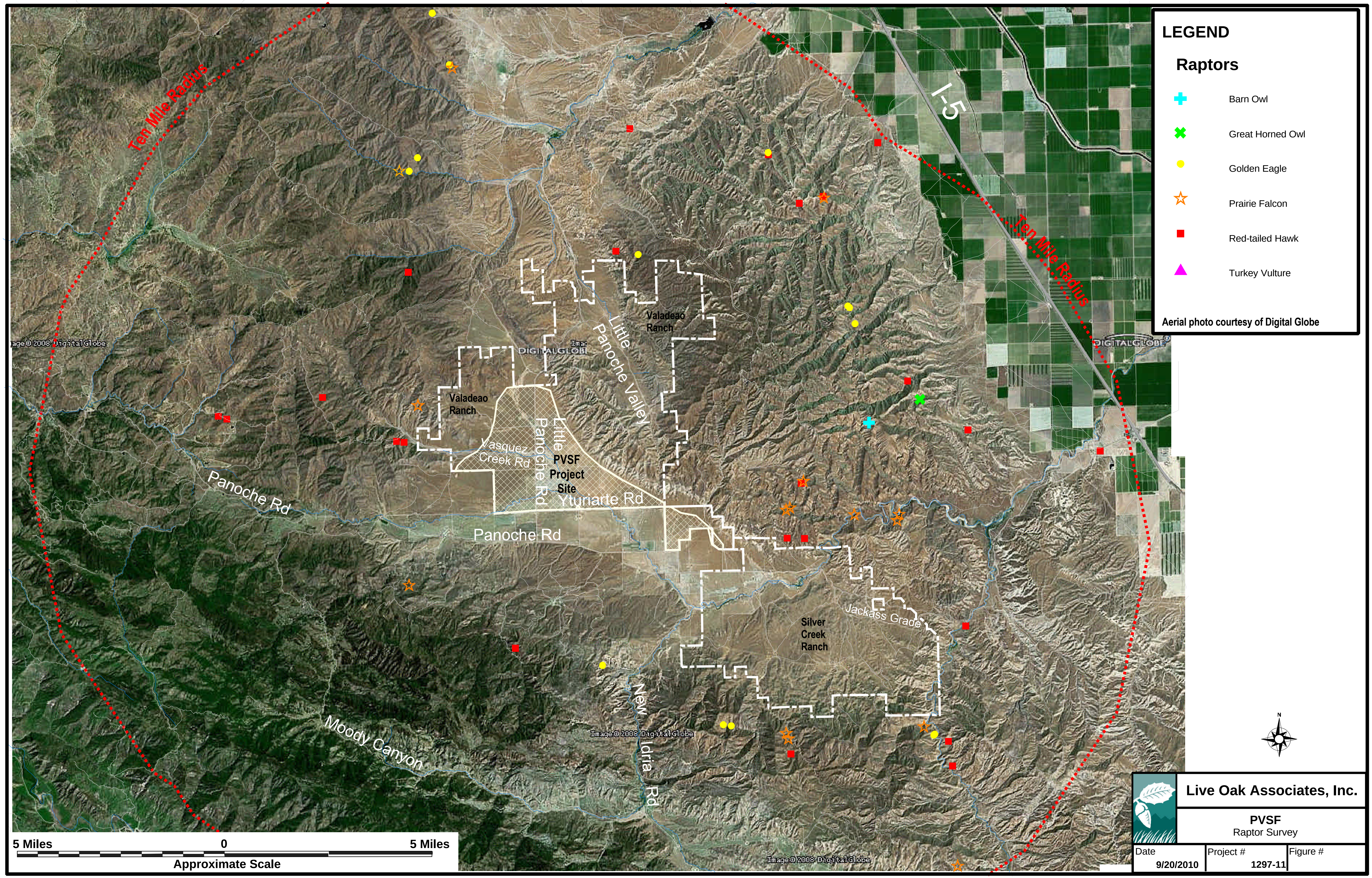


LEGEND
Raptors
Barn Owl
Great Horned Owl
Golden Eagle
Prairie Falcon
Red-tailed Hawk
Turkey Vulture
Aerial photo courtesy of Digital Globe
Ten Mile Radius
Ten Mile Radius
I-5
Valadeao Ranch
Valadeao Ranch
Little Panoche Valley
Little Panoche Rd
Vasquez Creek Rd
PVSF Project Site
Yturiarte Rd
Panoche Rd
Panoche Rd
Jackass Grade
Silver Creek Ranch
New Idria Rd
Moody Canyon
Image © 2008 Digital Globe
DIGITALGLOBE
5 Miles
0
5 Miles
Approximate Scale
Live Oak Associates, Inc.
PVSF
Raptor Survey
Date
9/20/2010
Project #
1297-11
Figure #

LIVE OAK ASSOCIATES, INC.
an Ecological Consulting Firm

DRAFT

SUMMARY OF THE CONSERVATION STRATEGY FOR FEDERALLY AND STATE LISTED SPECIES FOR THE PANOCHE VALLEY SOLAR FARM

April 27, 2010

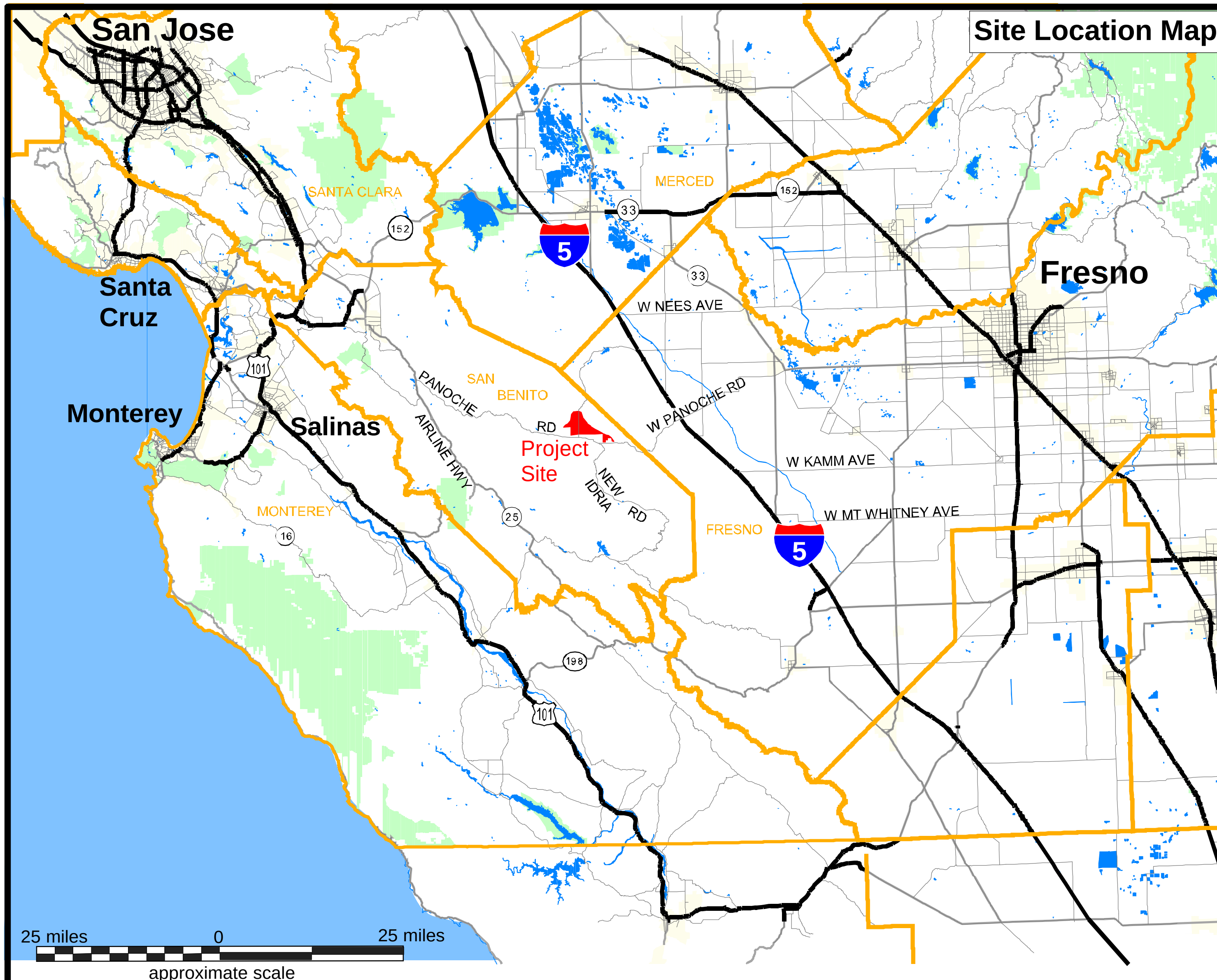
This summary of the conservation strategy proposed by Solargen Energy Inc. for its Panoche Valley Solar Farm (PVSF) outlines measures to avoid, minimize and compensate for take of federal (FESA) and state (CESA) listed species that may be affected by construction and operation of their solar farm (Figure 1). This is not intended to be a comprehensive treatise for the conservation strategy proposed for the PVSF, but provides sufficient detail as to the important components of the plan that have been completed along with on-going analysis and data collection intended to resolve data gaps.

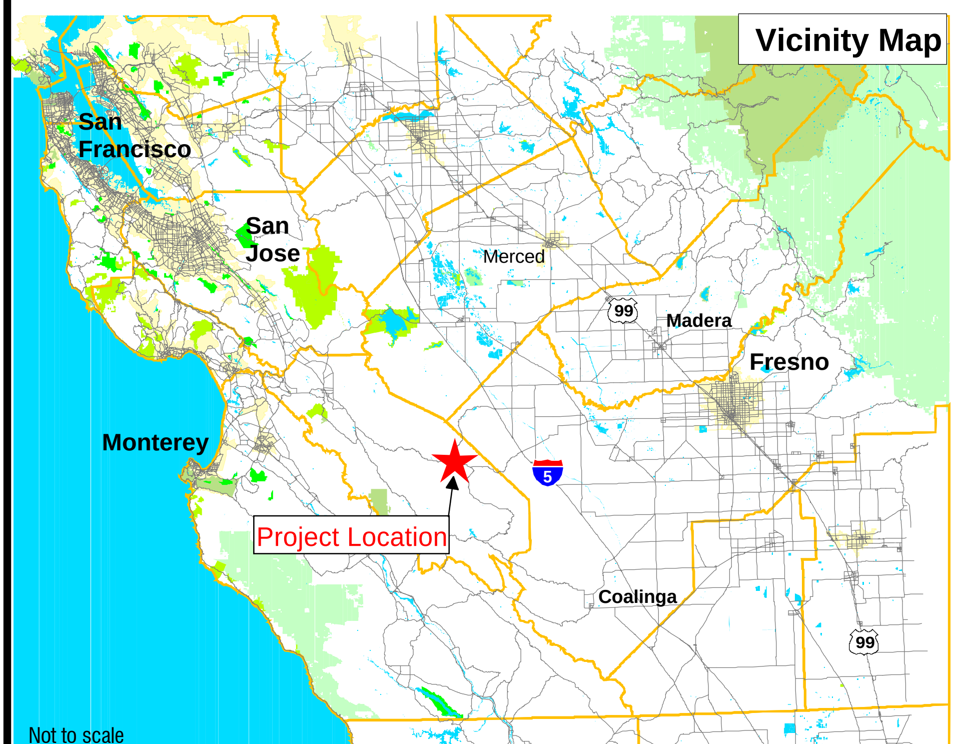
The conservation strategy summarized here, will serve as the foundation for both the Biological Assessment (BA) that is to be submitted to the USFWS for species listed under FESA and the 2081 Application that will be submitted to CDFG for species listed under CESA.

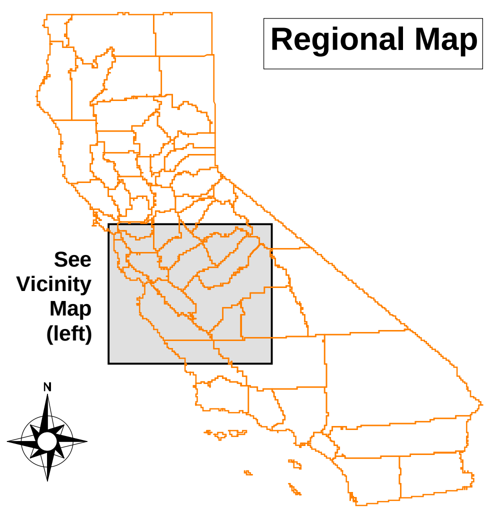
The covered species included in this mitigation plan include the following federal and state listed species:

- Vernal Pool Fairy Shrimp; *Branchinecta lynchi*; Federal threatened
- California Tiger Salamander; *Ambystoma californiense*; Federal and State Threatened
- Blunt-nosed Leopard Lizard; *Gambelia sila*; Federal and State Endangered/California Fully Protected
- Western Burrowing Owl; (*Athene cunicularia*); California Species of Special Concern/Federal Migratory Bird Treaty Act and Fish & Game Code 3501.5
- San Joaquin Antelope Squirrel; *Ammospermophilus nelsoni*; State Threatened
- Giant Kangaroo Rat; *Dipodomys ingens*; Federal and State Endangered
- San Joaquin Kit Fox; *Vulpes macrotis mutica*; Federal Endangered/State Threatened

Two species for which take cannot be authorized by CDFG (blunt-nosed leopard lizard and western burrowing owl) are included in this summary document, for completeness. The USFWS may provide take authorization for impacts to habitat for the blunt-nosed leopard lizard (BNLL), but they may not authorize take of individuals of either the BNLL or the Western burrowing owls (WBO).







Live Oak Associates, Inc.

Panoche Valley Solar Farm
Vicinity Map

Date	Project #	Figure #
4/27/2010	1297-05	1

Both Impacts and associated mitigations for non-listed special status species are being evaluated by the Environmental Impact Report (EIR) that is currently in preparation by the County of San Benito and will not be discussed here.

PROJECT DESCRIPTION

Solargen proposes to construct and operate a 420 megawatt (MW) photovoltaic (PV) solar power plant in Panoche Valley, an unincorporated area of eastern San Benito County. The project would be located on 4,717 acres and would include the following (Figure 2):

Installation of 1,822,800 silicon-based PV panels on framed, the worst case would be the use of 50 Watt panels, and this will give us 8,400,000 panels. The Proposed Nexpower 135 Watt panels will number 3,111,111. Panel count will depend on the panel chosen at the time of construction.

- single-pole steel support structures,
- electrical inverters and transformers,
- an electrical substation,
- an operations and maintenance (O&M) building,
- a septic system and leach field,
- On-site access roads, transmission support towers and line(s) to interconnect with a PG&E transmission line that passes through the project site. Requirements for the switchyard will come from PG&E as they will own a portion of this at the end of the project.
- Solargen is currently in the early stages of negotiations to sell the project's electrical output to PG&E.

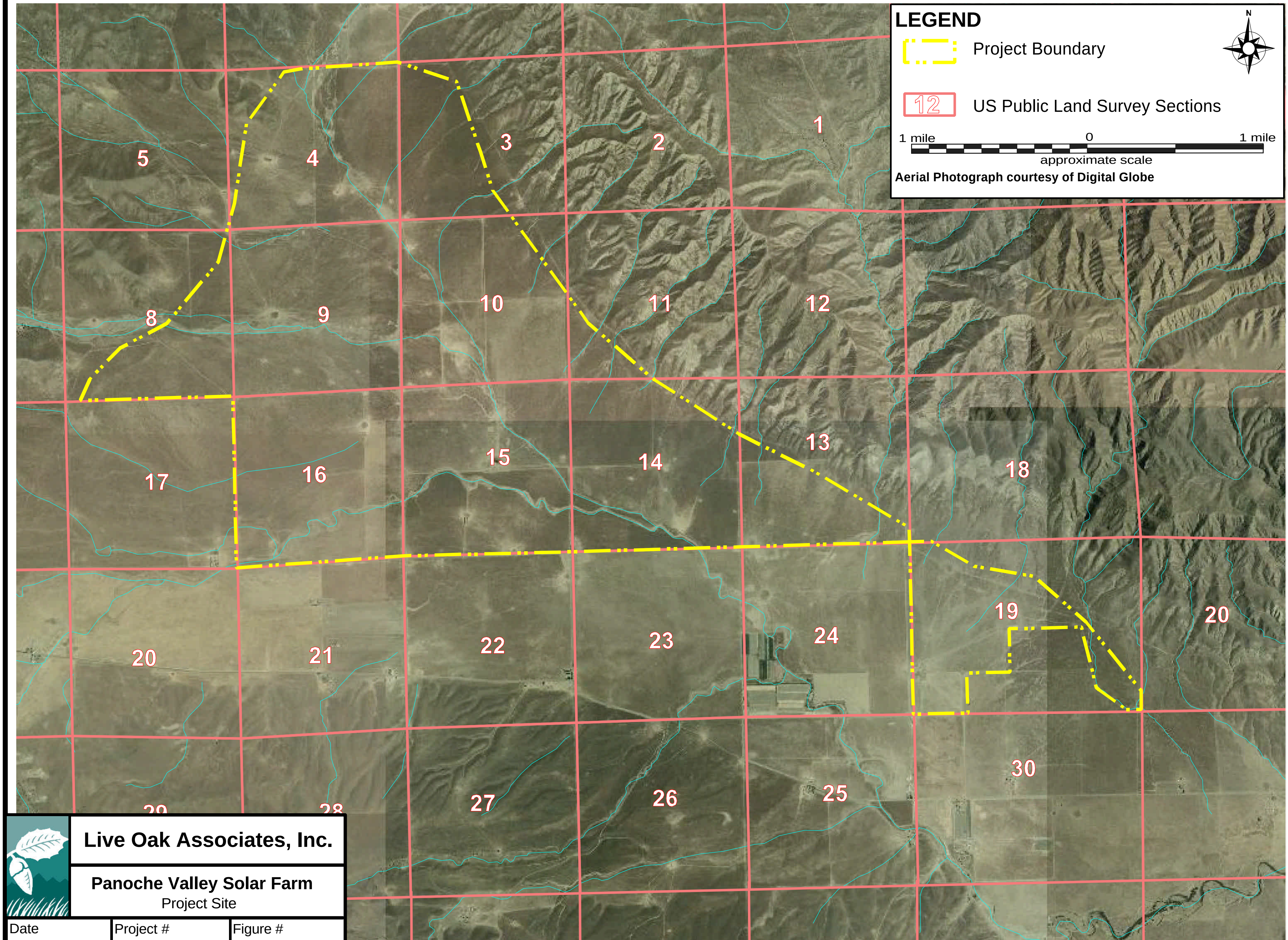
Solargen has applied to the County of San Benito (County) for a Conditional Use Permit (CUP) to allow a solar power plant to be operated on the site. Because of its responsibility for issuing this permit, the County is the lead agency under the California Environmental Quality Act (CEQA) and is responsible for the preparation of this EIR.

The proposed solar farm site comprises approximately 4,717 acres, is irregularly-shaped, and consists of all or parts of the following (Figure 2):

- Sections 3, 4, 8-11, and 13-16 of township 15 south, range 10 east; and
- Section 19 of township 15 south, range 11 east.

Lands adjacent to the proposed solar farm site are being proposed as mitigation for anticipated impacts to sensitive plant and wildlife impacts (Figure 3). These proposed mitigation lands consist of all or parts of the following:

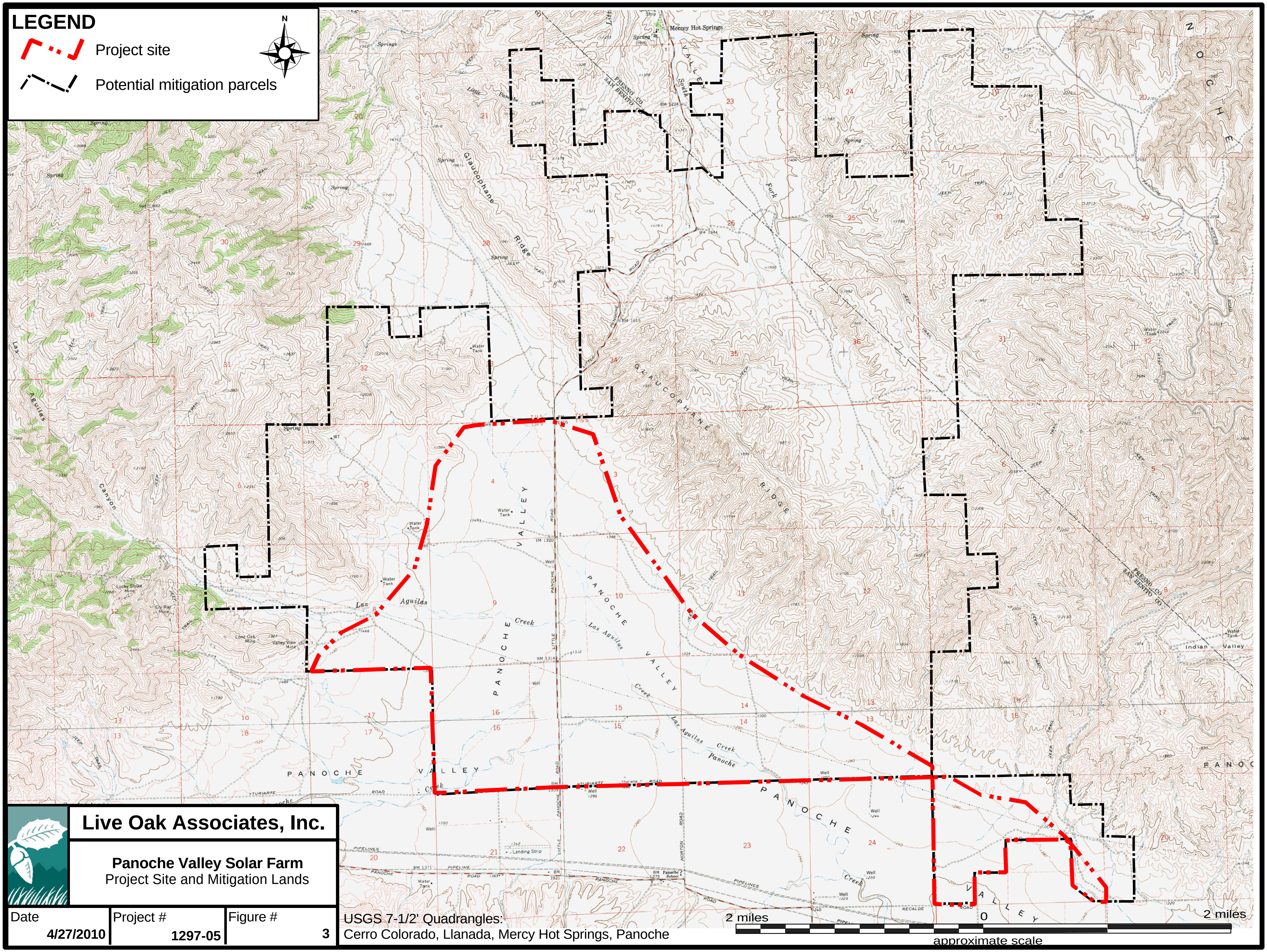
- Sections 19, 30, and 31 of township 14 south, range 11 east;
- Section 21-27 and 32-36 of township 14 south, range 10 east;



Live Oak Associates, Inc.

Panoche Valley Solar Farm
Project Site

Date	Project #	Figure #
4/14/2010	1297-05	N/A


LEGEND
N
Project site
Potential mitigation parcels
Live Oak Associates, Inc.
Panoche Valley Solar Farm
Project Site and Mitigation Lands
Date
4/27/2010
Project #
1297-05
Figure #
3
USGS 7-1/2' Quadrangles:
Cerro Colorado, Llanada, Mercy Hot Springs, Panoche
2 miles
0
2 miles
approximate scale

- Sections 1-8 and 11-14 of township 15 south, range 10 east; and
- Sections 6, 7, 19, and 20 of township 15 south, range 11 east.

The proposed solar farm site and a majority of the mitigation lands are all located in the eastern region of San Benito County, California, in an area known as the Panoche Valley. The northeastern extent of the proposed mitigation lands is located in western Fresno County and includes parts of Little Panoche Valley and Glaucophane Ridge.

The majority of parcels within the solar farm site are used for cattle grazing; the remaining lands are homesteads, patches of row crops, grape production and an old dairy. The site is surrounded by rangeland and bordered to the west by the Gabilan Range and to the east by the Panoche Hills. A number of drainages and creeks are present in the area including the aforementioned Panoche and Las Aguilas Creeks. The portion of the Valley associated with the proposed project ranges in elevation from approximately 1240 feet National Geodetic Vertical Datum (NGVD) to approximately 1400 NGVD.

ANTICIPATED LEVEL OF TAKE

There is a paucity of data on how PV solar arrays will affect the continued use of the site by the various species, particularly state or federally listed species. Many of these species (BNLL, GKR, SJAS) exhibit life history strategies that would be best classified as r-selected species, with high reproductive capacity that more closely tracks changes in resource production than species with lower reproductive rates that usually exhibit longer lag time in a functional and/or numerical response. In fact, populations of these species that occur on site are known to fluctuate substantially with rainfall patterns – wetter years tend to produce higher food resources, higher reproductive rates, and increasing populations. Poorer rainfall years, particularly several in a row can lead to depressed populations.

The proposed project would be installed over an area of approximately 4,717 acres (7.4 square miles). However, the proposed design confines the solar arrays, substation, and facility buildings to a footprint of 2,201.5 acres, on-site access roads would occupy approximately 30 acres, and buried electrical collection conduit would occupy 37.4 acres. The remaining 1,680 acres (35% of the site) within the project boundary would be left undisturbed and unshaded. Undisturbed areas would include on-site drainages and riparian buffer zones.

The entire site is currently grazed with no consideration to maintaining the suitability of the site for the target species. These species persist in spite of the current grazing regime, which is driven almost exclusively on economic objectives. Observational data for these species indicate that they generally prefer short grass conditions, with very limited experimental evidence supporting a specific grazing regime.

The project has integrated a number of design features to avoid impacts when possible by avoiding wash and stream habitats - barren areas that may support BNLL or other burrowing species by setting back from the habitat features by minimum of 100 ft from the top of bank.

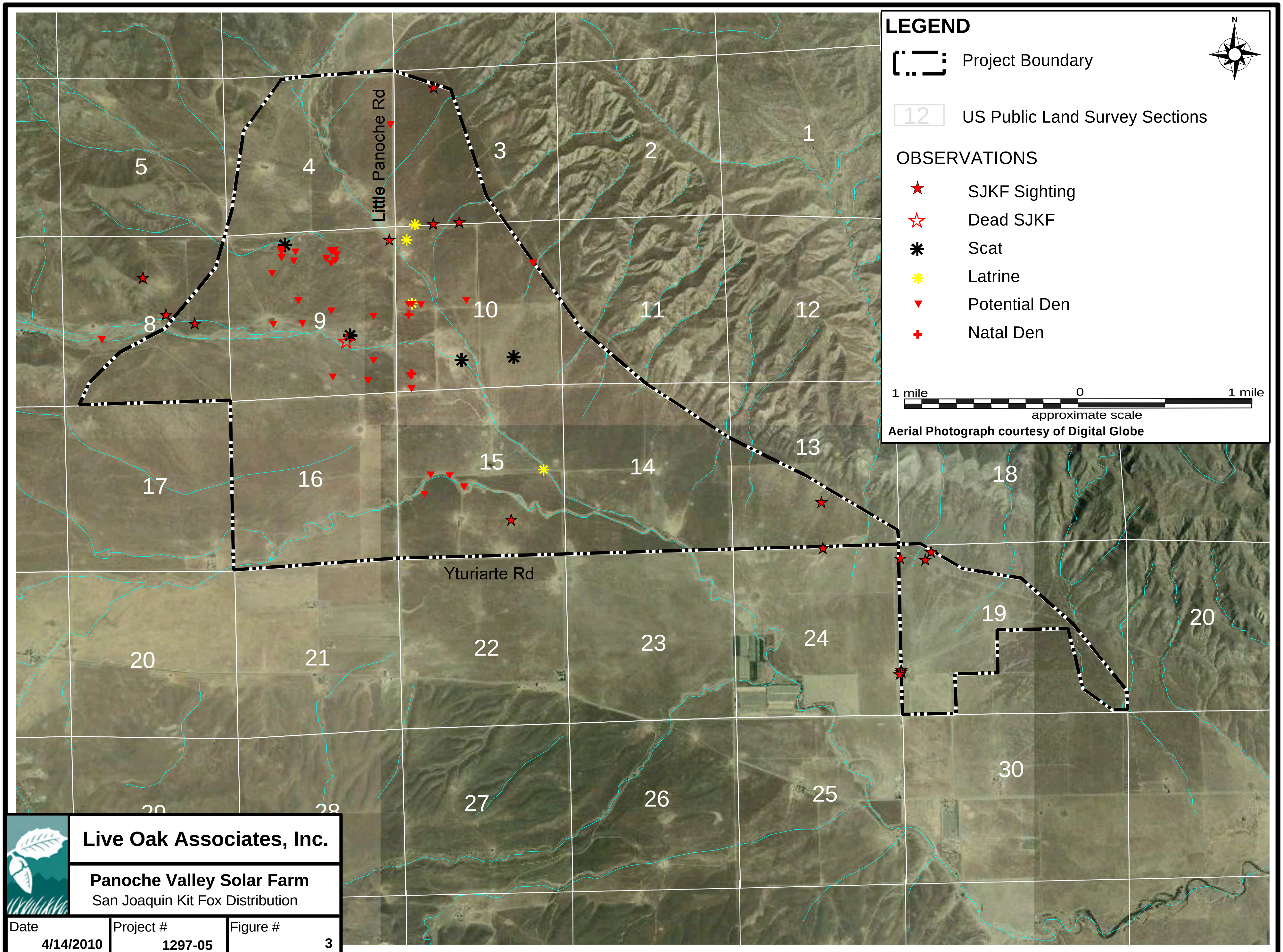
Approximately 12% (603 acres) of the site will be shaded by solar arrays while approximately 35% (1680 acres) of the site will remain undisturbed and unshaded by solar arrays. Little is know how listed species known to occur on site will react to the placement of a solar farm on the landscape. The solar arrays, roads, supporting facilities are expected to have some adverse affect on these species continued use of the site as shading may alter the micro-climate under the arrays, and undisturbed habitats (35% of the site) will be fragmented. However, construction and operation of the solar farm is intended to avoid and minimize impacts to existing resources to the maximum extent practicable and on-going management of the grasslands that will remain on site are intended to be specifically managed to maximize food productions for such species as GKR and other small burrowing animals. Therefore, while some degradation is expected, it is unreasonable to assume that the site will completely lack suitable habitat attributes for these species to persist at some lower level. These same set of species are known to occur at modest levels within any number of oil fields of varying development density in Kern County – habitats that are also fragmented by oil wells, pipelines and roads. Admittedly, the percent of the landscaped converted to developed uses in oil fields is usually less, but the fact that the facilities fragment the landscape is undeniable, yet many of these species persist in modest to high numbers as long as suitable habitat attributes exists and food resources remain relatively modest or high.

WBO for instance are known to occur in high densities in human altered landscapes. For example, the WBO in the agricultural areas of Imperial County where as much as 70% of the states population presently occurs, is estimated to approach a density 50 times higher than the desert communities would support naturally. WBO actively use agricultural roads and levees in the San Joaquin Valley and occur regularly in grassland habitats adjacent to dense development in the Bay Area Counties. Nonetheless, at buildout, WBO are expected to continue to use the site, but likely to a lesser degree.

The SJKF has been detected on site on number of occasions during biological surveys conducted for this project (Figure 4). This site supports suitable landscape attributes to provide foraging, breeding and movement habitat for the species within a regional context. The recovery plan for upland species of the San Joaquin Valley recognizes the Ciervo-Panoche Natural Area as one of the three remaining core populations for kit fox. While not its preferred habitat, this species is known to use fragmented habitats associated with on-going and developing oil fields in Western Kern County. For example, more than twenty-five years (1979 to 2004) of data were collected at the Naval Petroleum Reservoir (NPR1 and NPR2) that has been in oil production since the early 1900's with oil production increasing markedly since the mid-1990's. SJKF have continued to be detected throughout the oil fields during the last decade, including the rather varied and steep topography associated with NPR1.

A well known population of kit foxes is associated with the urban environments of the City of Bakersfield – again, not a preferred circumstance, but evidence that the species response can accommodate human dominated landscapes.

Mammalian carnivores are intelligent and idiosyncratic. While individual kit foxes in the Panoche Valley region have had to contend with some limited traffic, farm houses, pets and other aspects of human existence in a rural environment, they have not had to accommodate



Live Oak Associates, Inc.

Panoche Valley Solar Farm

San Joaquin Kit Fox Distribution

Date	Project #	Figure #
4/14/2010	1297-05	3

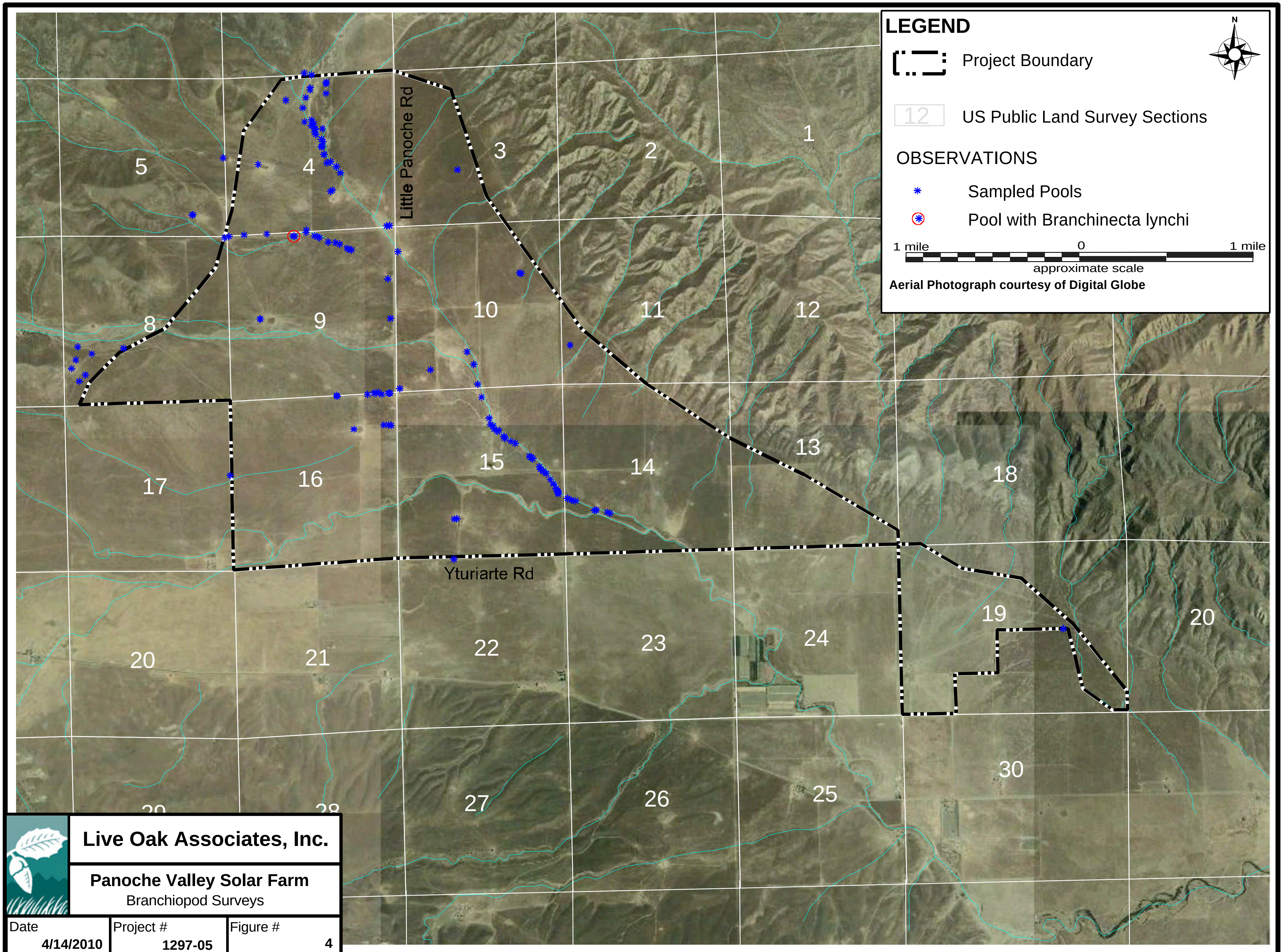
large landscape scale changes, such as a solar farm. Given that the site will be managed largely through grazing to maximize the occurrence of small mammals – important prey for kit fox, we would expect that kit foxes will take advantage of the availability and distribution of any remaining GKR burrow clusters. The site will be managed to also promote egress and ingress of wildlife species, particularly kit foxes. As foxes are known to den in landscape medians at shopping malls in Bakersfield, we would expect that foxes would continue to use the site also for breeding. As noted for GKR, we do expect the overall value for kit foxes to be less than it was prior to the construction and operation of the solar farm.

A total of 126 pools were sampled for listed brachiopods and CTS. California tiger salamander (CTS) larvae were only detected in one pool just off the western boundary while the listed vernal pool fairy shrimp was detected also in only one pool (Figures 5 and 6). In general these pools are rather devoid of aquatic life and in fact during a one-month period of time the CTS larvae had shown no marked growth – indicating poor forage production. Larval surveys are on-going and will be completed in May 2010. The first wet season surveys for brachiopod have been completed with follow up dry season surveys planned to be completed during the summer of 2010.

The pool that supports CTS just to the west of the project will remain intact, but solar arrays will be placed in areas to the east of this pond that could support upland habitat for this species. If 2010 larval surveys confirm this as the only breeding locale on site, than solar arrays in the upland habitats to the east of this pond would affect roughly half of the upland habitat associated with this pond. Unlike many development projects that certainly convert the upland habitat east of the pond to developed uses rendering it useless for estivating salamanders, solar farm should retain some residual value, particular if it is managed for small mammals, the burrows of which are critical for CTS.

The San Joaquin antelope squirrel (presently three sighting) appears quite limited and restricted on site. On-going surveys for these three species will provide additional information as to this species rarity on site.

The level of take of habitat cannot be presently estimated BNLL. The level of take for vernal pool fairy shrimp (VPFS) and the San Joaquin antelope squirrel (SJAS) is expected to be rather limited to a small portion of the site. Three species are more common on site and the modifications of the landscape by the solar farm is expected to have a more pronounced affect on these species: WBO, GKR and SJKF. The CTS is also limited in its extent on site, but the amount of habitat affected by the project could range upward of 175 acres (assuming the majority of the population estivates within 2200 ft of the pond). Therefore, for the purpose of this analysis, given the level of proposed landscaped changes, we suggest that the site will degraded by about 60% for these four species. In other words, a 40% residual value will remain for the CTS, WBO, GKR and the SJKF.

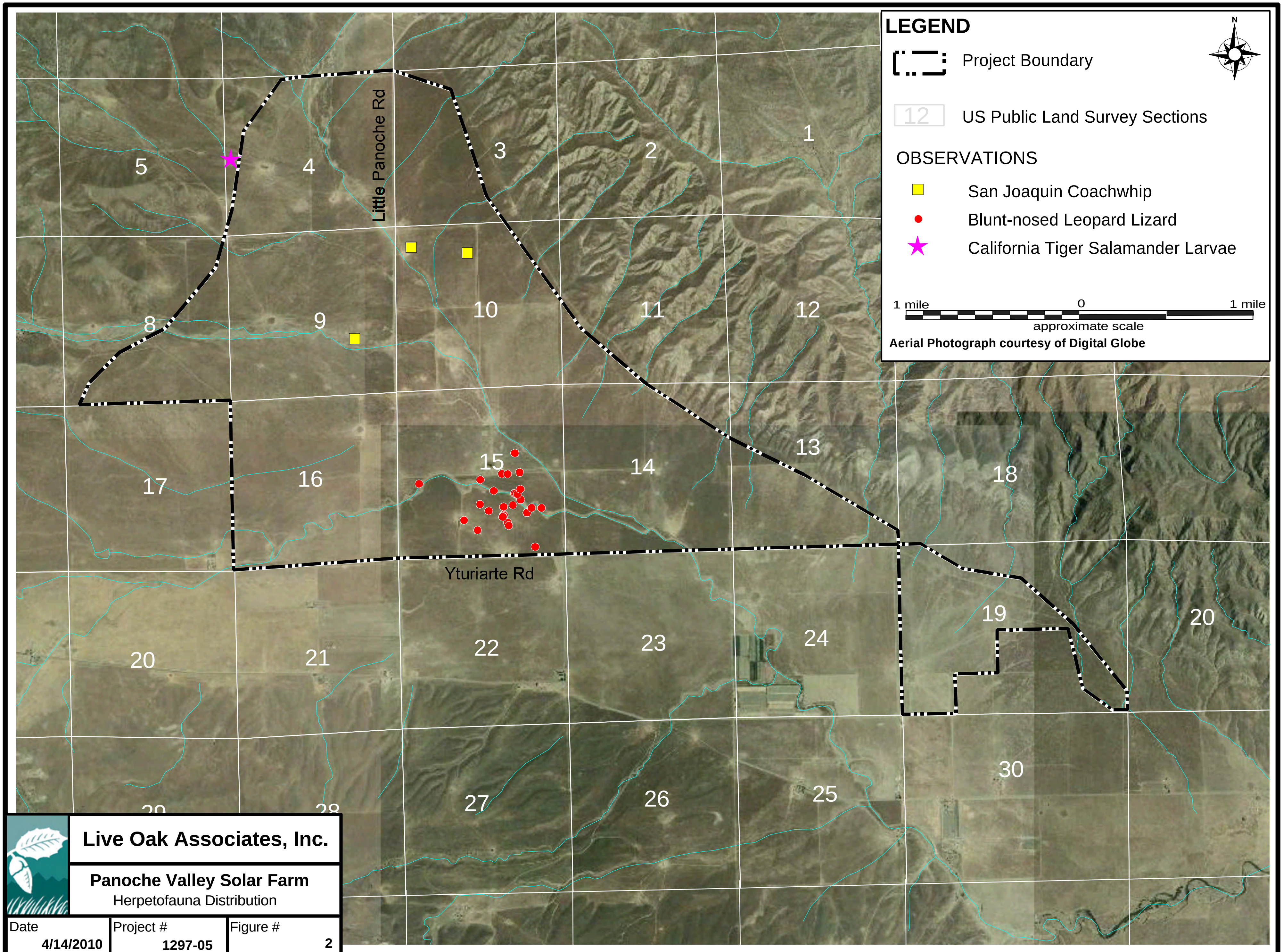


Live Oak Associates, Inc.

Panoche Valley Solar Farm

Branchiopod Surveys

Date	Project #	Figure #
4/14/2010	1297-05	4


LEGEND
Project Boundary
12
US Public Land Survey Sections
OBSERVATIONS
San Joaquin Coachwhip
Blunt-nosed Leopard Lizard
California Tiger Salamander Larvae
N
1 mile
0
1 mile
approximate scale
Aerial Photograph courtesy of Digital Globe
Little Panoche Rd
Yturiarte Rd
1
2
3
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5
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Live Oak Associates, Inc.
Panoche Valley Solar Farm
Herpetofauna Distribution
Date
4/14/2010
Project #
1297-05
Figure #
2

Species for Which Take of Individuals Will Not Occur

The project will not result in take of BNLL or WBO.

Blunt-nosed Leopard Lizard
Solargen has developed a three-step process which the Panoche Valley Solar Farm (PVSF) will implement to ensure that the construction and operation of the project fully complies with the Fish and Game Code obligation to avoid take of the fully protected blunt-nosed leopard lizard (BNLL).1

Step One – Avoidance Through Project Design: The occurrence of blunt-nosed leopard lizards (BNLL) in wide, sandy bottomed washes in low relief terrain has been well documented; as a result, all such washes observed during all surveys (protocol and quantitative sampling efforts) are considered to represent potential blunt-nosed leopard lizard habitat and should not be disturbed to the maximum extent practicable. Therefore, Solargen has provided in their design of the photovoltaic facility on the Panoche Valley Solar Farm (PVSF) a buffer of no less than 100 feet from all streams and washes crossing the project site. The buffer will be measured from the top-of-bank for each side of the features. Thus, no disturbance will occur within these habitats, or within 100' from the edge of these habitats, except for a few unavoidable road crossings (which will be designed to minimize their impact as described below). As a result, the most likely locations for BNLL occurrence on the project site will be avoided.

Step Two – Avoidance in Construction Areas Through Additional Protocol Surveys: For road crossings through washes that are unavoidable, protocol BNLL surveys (extent of which will be pre-approved by CDFG) will be completed for the limited areas where bridges will be constructed If BNLL are detected during these surveys, then they will be avoided with a 50 ft. buffer and exclusion fencing erected to keep them out of the work area where the bridge is being constructed. Even in the advent of negative survey results, as a matter of precaution, a 30-ft buffer from small mammal burrows in washes will be recognized during construction of bridges over washes. The standard recommendation prohibits vehicles traversing washes except in defined work zones.

For construction of the solar panel arrays, protocol BNLL surveys during the adult season (April 15 to July 15) will precede ground disturbance regardless of type of habitat. This recognizes that construction can occur any time after the completion of these surveys, but prior to the next adult season (see pre-construction and construction monitoring below). Avoidance recommendations and buffers as shown below will be adhered to (Table 1). If BNLL are detected in non-wash habitats during the protocol surveys conducted prior to each phase (or during any sort of survey for that matter), than the project will redesign their solar arrays to accommodate this detection by placing a 5 acre buffer (approximately a 265 ft radius) over the observation in such as to capture areas of high burrow density. Five acres is roughly equivalent to the average female home range as reported by Warrick et al. (1998). In other words, the buffer will not be a simple circle with a 265 ft radius, but a polygon that captures the best available habitat for this detection; with a caveat that no component of the project will occur within 50 ft of this sighting

1 Compensation for loss of habitat for BNLL associated with this project will be permitted by the U.S. Fish and Wildlife Service (USFWS) via the Section 7 process and will not be discussed in this document.

Step Three – Avoidance in Construction Areas Through Pre-Construction Surveys and Construction Monitoring: All construction activities must be preceded, by not more than 30 days, by a pre-construction survey for BNLL. If a BNLL is observed within a construction area, that location will conform to the 5-acre buffer as described above. This buffer will immediately be marked by construction fencing or flagging, and will be avoided until it is determined that the BNLL has moved out of the construction zone.

Table 1. Avoidance and Minimization Measures for the BNLL on the PVSF project.

Avoidance and Minimization Measures	**Description**
Avoidance of washes and streams	Washes and streams should be avoided by the project including a 50-ft buffer as measured from the top-of-bank on both sides of these features.
Avoidance Zones for bridge construction – protocol surveys	Protocol surveys will be conducted during the April 15 to July 15 adult BNLL season prior to any disturbance associated with constructing the limited number of bridges necessary for the project. Therefore, in these few cases where complete avoidance of washes and streams are not feasible the project will establish 30-ft buffers from small mammal burrows (whether BNLL are detected at them or not) in wash bottoms and 50-ft buffers from any observed BNLL location in these features. These buffer zones will be demarcated by construction fencing to ensure that construction crews do not enter the avoidance zone. Monitors will be present during construction activities.
Avoidance for non-wash habitats – protocol surveys	Protocol surveys will be conducted during the adult season period of April 15 to July 15 prior to any surface disturbance. Project elements will avoid all observations of BNLL based on a 5-acre buffer that will be encompass the sighting and include the best available habitat within this 5-acres; the closest edge of the buffer to the sighting will be 50ft.
Avoidance through pre-construction surveys and construction monitoring	All construction activity including all vehicular traffic should be contained within the defined construction zone. The construction zone will be demarcated with exclusion fencing to ensure that a BNLL does not errantly wander into the construction zone. An on-site monitor will be present during all construction activity in this area. In addition, pre-construction surveys will be conducted no more than 30 days prior

	to any surface disturbance and on-site monitor will be present during all construction activities to ensure that the project does not harm or injure individual BNLL. If a BNLL is detected during construction by the on-site monitor, than the 5-acre buffer as described above will be established around this location and the project will avoid constructing any project elements within this buffer. The project will also implement all BMPs as discussed below.

In addition the avoidance measures discussed above, Solargen will also conduct a series of protocol surveys, quantitative sampling, preconstruction surveys and construction monitoring to further ensure that the project is built and operated in such a way as to remain in compliance with the Fish and Game Code.

Phase I – Section 16 (2010 Surveys)

The construction of Phase I of the project is now expected to occur on Section 16 (640 acres). Phase I will consist of approximately 200 acres of photovoltaic solar panels, and associated infrastructure. Full protocol-level adult BNLL surveys will be conducted on all of Section 16 between 15 April and 15 July 2010 (12 full surveys will be completed for adults whether BNLL are observed or not). Protocol-level juvenile BNLL surveys (5 full surveys) will be conducted on all of Section 16 between 1 August and 15 September 15 2010 if adult surveys are negative for BNLL presence. All surveys conducted will precisely follow the conditions detailed in CDFG's May 2004 *Approved Survey Methodology for the Blunt-nosed Leopard Lizard*. Appropriate buffers, and the pre-construction surveys and construction monitoring measures described below, will be employed to ensure that no take of BNLL occurs. The quantitative sampling efforts described below and beginning the spring of 2010 will also inform the precise design of Phase I.

Quantitative Sampling (2010)

Based on the site-specific information generated from the 2009 protocol surveys, Live Oak Associates, Inc. developed a quantitative sampling methodology to be employed on the entire 4,717-acre project site in 2010. One purpose of this approach is to inform project design by identifying areas of likely BNLL presence (which areas the project would avoid and preserve) and absence (which areas would be the focus of project construction); as described below, this information would later be supplemented by focused surveys and construction monitoring on a phase-by-phase basis to ensure take avoidance. The sampling methodology will also produce robust BNLL information for the entire project site for purposes of analyzing biological resource impacts in the EIR. This sampling methodology consists of the following:

- Quantitative sampling proposed (i.e., occupancy modeling framework – change over time metrics) over the entire project site for BNLL and other targeted species (e.g., BUOW, SJAS, GKR, SJKF, etc.). 90-random and 45-targeted sampling points distributed across the 4,717-acre project site. Sampling points will be no closer than 280m to ensure independence of the sampling unit and each sampling point will be buffered by a 2 ha (5-

acre) area that will be intensely surveyed consistent with established agency protocol for adult BNLL between 15 April and 15 July 2010. Each sampling unit will be visited 5 times during this 3-month window which allows estimates of important parameters of detection probability, occupancy, colonization and extinction over a multi-season (multi-year) basis. Sampling effort can either be increased spatially or temporally. It is common within an occupancy framework to maximize effort temporally for the expressed purpose of developing detection histories. We have chosen 5 surveys conducted during the adult survey window based on Germano (2009), which states the average time to detect BNLL is 2.27 days (n=48 10-day efforts). The average time to detect the species decreases to 1.18 days when the species is abundant and increases to 3.60 days when the species is sparse.

Full Coverage Surveys for future Phases

For all future phases of project construction, initial project design will be informed by the 2010 sampling methodology and subsequent years of sampling. This will be supplemented phase-by-phase by full protocol-level surveys (12 surveys) for BNLL adults, to be performed between the 15 April and 15 July survey period preceding construction of that phase. As noted above, if no BNLL are detected during the adult survey window, then full coverage surveys will be conducted during the juvenile period (five full coverage surveys conducted between 1 August and 15 September). However, if BNLL are detected during the adult season, then no surveys will be conducted during the juvenile season. Appropriate buffers will be employed to ensure that no take of BNLL occurs.

Pre-construction and Construction Monitoring

As described above, each phase of project construction will be preceded by both (1) the sampling methodology survey, and (2) focused protocol-level surveys for adult BNLL during the optimal survey period of 15 April to 15 July. In addition, Solargen will employ extensive pre-construction and construction monitoring in each construction phase to further ensure that take does not occur. A qualified biologist will (1) conduct one full-coverage pre-construction survey within 30 days prior to the onset of construction, (2) conduct an additional pre-construction survey immediately prior to the onset of construction, and (3) conduct ongoing monitoring of construction activities in any areas that could potentially be occupied by BNLL.

Operation

The project will be operating in such a way as to not harm or injure a BNLL during the life of the project. Standard procedures will be employed as are done for other projects in BNLL range (e.g., oil fields) and will include (but not be limited to), staff training, pre-established speed limits, etc.

The project while designed to not take individuals may result in the loss of some undermined amount of habitat for this species. Those studies discussed above will provide a more precise estimate as to the amount of habitat likely affected by this project.

The current project design is expected to avoid wash and creek habitats in such a manner as these areas are expected to continue to operate at some level for the species. It will not be possible to evaluate the overall affect of the project on the loss of BNLL habitat until such time as the 2010 surveys are complete.

WBO
The WBO is widely distributed in the state with approximately 70% of its population for the state occurring in Riverside and Imperial County. The southern and central San Joaquin Valley is estimated to support approximately 15% of it population. This site may support wintering and breeding habitat for a number of pairs of owls (surveys in 2010 are expected to provide a better measure of their distribution and abundance on the site). While this site may be important for this species, the loss or degradation of the entire project site for this species is not expected to result in jeopardy, given the measures employed to ensure no take of WBO, particularly breeding birds, and given the relative abundance and distribution of this species in the region, off of the project site.

Species for Which Sufficient Data Exist to Estimate Take of Individuals and/or Habitat

As previously discussed, based on current information the project will result in limited loss of habitat for three species: VPFS, CTS and SJAS. As noted above, while only one breeding pond has been identified for CTS, up to 175 acres of upland habitat could be affected (but not eliminated) by this project. For the purpose of this summary, these species will not be considered further. The comprehensive mitigation plan discussed in detail in the BA and 2081 Application will provide suitable details for the relevant species. These documents will address all federal and state listed species to ensure that appropriate avoidance, minimization and compensation measures and employed for each of these species. In addition, the adequacy of the mitigation plan to compensate for loss of habitat for BNLL is not presently known as these surveys are just now getting underway.

Specific Data Analysis Associated with Distance Sampling for GKR and San Joaquin Kit Fox

The methodologies described below and in Appendix A provide good estimates as to the level of take and the adequacy of the mitigation lands to compensate for this impact. For the purpose of this analysis we conducted line transect surveys using distance sampling (Buckland *et al*. 2001) in 63.6 sq km Panoche Valley study area in late February and March 2010. These sampling surveys occurred on both the 4717 acres Project Site and the 11,000acres Mitigation site. North-south transects were walked that were placed at approximately 350 m intervals in the study area (Figure 3). For the analysis, the study area was considered in its entirety and into areas of interest for this effort: the Mitigation Lands (44.5 sq km), the Project Area (19.1 sq km) and, for two transects that spanned both Lands, a combined site Mitigation/Project Area (63.6 sq km).

The locations of target resources and, in some cases, estimated densities were recorded. The methods for burrow cluster data collection were modeled after Townsend 2006 and Townsend & Zahler 2006 for density estimates of burrow cluster and potential San Joaquin kit fox den.

The targets include the following:

Primary Targets

1. Potential kangaroo rat burrows complexes (based on time and shape, other sign)
2. Giant kangaroo rat and giant kangaroo rat burrow complexes

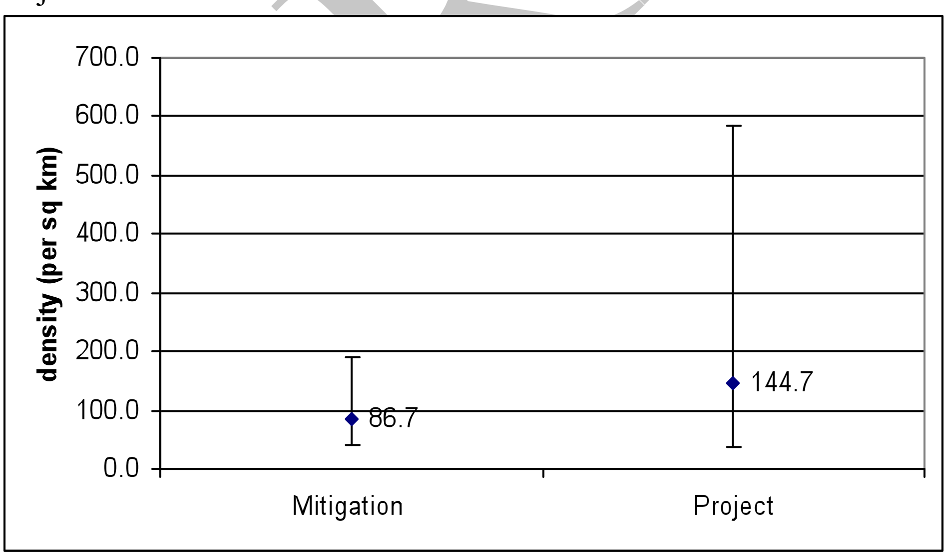
3. San Joaquin Kit Fox and potential San Joaquin kit fox dens (4.5 inches in diameter or greater, other sign)
4. Blunt nosed leopard lizards and habitat
1. San Joaquin antelope squirrel and habitat
2. Badger and badger den (distinct half moon shape – much wider than tall, other sign)
3. burrowing owl and burrowing owl burrows (burrow with white wash or pellets, burrowing owl feathers)

Secondary Targets
3. Carnivore Scat
4. Raptors – eagles, hawks, falcons, owls
5. Loggerhead Shrikes
6. Mountain Plovers
7. Local carnivores: coyotes, bobcat, cougar, red fox

See Appendix A. for details related to the Methodology and Results. Only relevant information well be summarized in this section.

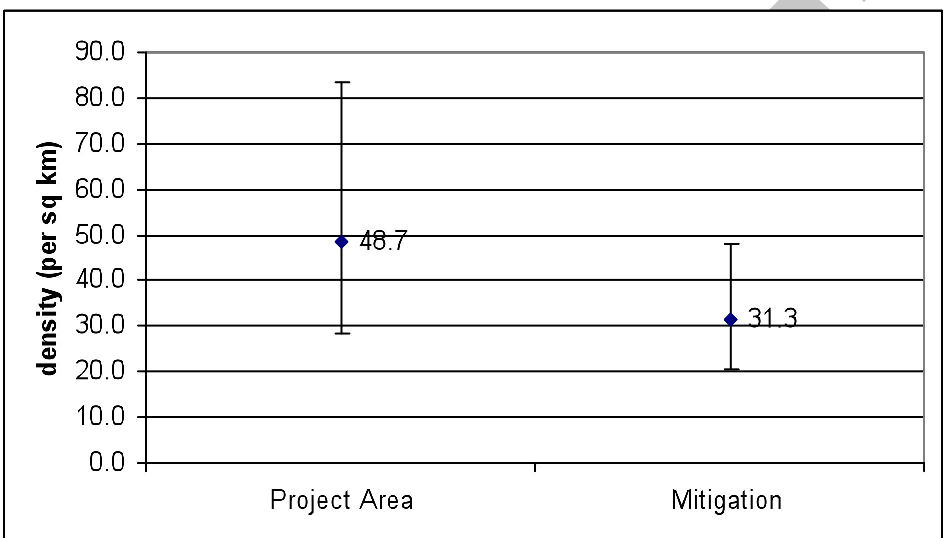
The density of burrow clusters for GKR were higher on the project site than mitigation site, however, the Project Site had much wider confidence intervals due largely to a smaller sample size. Additional data are currently being analyzed and early indications suggest that while there are fewer burrow clusters per km^2 on the mitigation site for GKR, the size of the burrow clusters are much larger on the mitigation lands likely yielding larger populations of GKR for the mitigation site when compared with the Project Site. Those data analysis will be available by the end of April.

Figure 7: Giant kangaroo rat density estimates (with upper and lower CI) for the Mitigation and Project Areas.



The density estimates for San Joaquin kit fox dens, badger dens, other carnivore dens and burrowing owl burrows was higher on the Project Site than on the mitigation lands (Figure 8).

Figure 8: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI for the Mitigation and the Project Area.



MITIGATION LAND

Biological Goals and Objectives

The biological goals are broad, guiding principles for the conservation program for this project and provide a rationale for the minimization and mitigation strategies. Biological objectives provide direction in management in order to achieve biological goals. These biological goals and objectives are specifically tailored to address the impacts and duration of the permitted activities. The goals and objectives guide the development of an adequate and effective conservation program.

Goal 1
Maintain viable, self-sustaining populations of the Covered Species within the Project Site and associated mitigation lands

Objective: Implement avoidance and minimization measures to minimize impacts of Covered Activities on the Covered Species within the PVSF.

Objective: Identify important movement areas (corridors) for key species and prioritize those lands for acquisition for conservation purposes.

Objective: Establish, enhance and manage permanent conservation areas to benefit the Covered Species.

Objective: Implement a monitoring program that provides sufficient information to determine relative fluctuations in Covered Species numbers in the PVSF and associated conservation lands and provides a feedback loop for adaptive management.

Goal 2

Establish at PVSF and on surrounding lands a Covered Species preserve system that complements and provides important linkages to other conservation lands, lands supporting covered species and conservation efforts in the region

Objective: Contribute monitoring data about the presence and relative abundance of Covered Species on the PVSF and associated conservation lands for use in regional conservation planning.

Goal 3

Minimize and avoid loss of individual Covered Species and their habitats during construction and operation of PVSF

Objective: Avoid and minimize impacts to Covered Species through the implementation of preconstruction surveys, best management practices, and an employee education program

Goal 4

Fully mitigate impacts to CESA-listed Covered Species by improving the existing conservation value of mitigation lands for Covered Species

Objective: Eliminate unauthorized off-road vehicle and pedestrian trespassing on mitigation lands through fencing and security patrols

Objective: Conduct appropriate site-specific habitat restoration and enhancement activities

Goal 5

Establish a conservation program for the PVSF and mitigation lands that are consistent with published recovery plans

Objective: Establish conserved lands in perpetuity in order to benefit Covered Species.

Goal 6

Have no take of the blunt-nosed leopard lizard so long as the species remains a "fully protected" species under California law and no take of burrowing owl under the MBTA and Fish and Game Code Section 3503.5.

Objective: Strictly enforce BNLL-specific pre-construction survey protocols and resulting recommendations, and implement BNLL-specific best management practices, to ensure take of BNLL does not occur.

Objective: Enforce all relevant conservation measures to ensure no take of individual or nesting burrowing owl occurs.

Goal 7

Do not exceed annual take limits of Covered Species

Objective: Use annual reporting to inform USFWS/CDFG about take of Covered Species

Objective: Maintain database to track annual take.

Goal 8

Implement an effective adaptive management program

Objective: Use the on-going monitoring for the project site and mitigation lands to adjust management and avoidance and minimization strategies in order to promote Covered Species' viability.

Objective: Collect data systematically on Covered Species on an annual basis and manage data for accessibility.

Objective: Maintain a central database that uses geographical information system for spatial analysis and presentation of Covered Species locations.

Objective: Use unbiased sampling techniques to collect scientifically credible information about Covered Species abundance and distribution.

Objective: Implement a study to measure preferred habitat characteristics for GKR and use this information for future habitat enhancement.

Objective: Utilize methods to verify if monitoring is sufficient to detect species based on sign alone for the GKR.

Compensation Measures

As noted above, the goal of the avoidance and minimization measures is to reduce the potential for take (see Appendix B). Even if the project successfully avoided all take, conversion of land suitable to support the species, may compromise and reduce the amount of suitable habitat available to the regional populations of the covered species. It has been suggested above solar farms do not render a site completely unsuitable and that a residual value of 40% remains for species such as CTS (upland habitat), WBO, GKR, and SJKF. Therefore, Solargen had developed a program for compensating for these impacts to the habitats of covered species.

The compensation program is based on the level of lost value for the covered species on the project site. The primary goal of the compensation program is to ensure that the lands proposed by Solargen to compensate contain the suitable characteristics of, and can be enhanced and restored to support the habitat features required by the species whose habitats were affected.

Solargen has identified approximately 11,000 acres of land to compensate for impacts to covered species. These lands are mostly to the north of the site (Figure 3).

The following principle will be applied to the conservation program:

- Compensation lands will be carefully tailored to reflect the relative importance of the specific lands disturbed by the PVSF. The quantitative sampling (results derived from both the distance sampling and occupancy model sampling) will be used to establish the conservation lands of both the PVSF site and the mitigation lands to ensure that the compensation lands provides habitat values and opportunities that allow the project to fully mitigate.

The following are the key elements of the conservation strategy for fully mitigating impacts to habitat for the covered species.

- Solargen will manage the identified Conservation Lands for habitat purposes only.
- Solargen will enhance the existing habitat conditions on the Conservation Lands, in order to meet the "fully mitigate" standard of CESA, through a variety of means depending on site-specific needs. For example, Conservation Lands may be suitably fenced (e.g., wildlife friendly) along public roads in order to prevent trespassing and damaging use by off-road vehicles. In other locations, Solargen may remove non-native species and/or may plant native species. These measures will be detailed in the final mitigation plan.
- Solargen has identified 11,000 acres for mitigation adjoining the project site. As the project is planned in 5 phases Solargen will place a conservation easement on 2,200 acres for each phase. Thus, prior to the construction of Phase I, Solargen will establish a Conservation Easement on 2,200 acres with an appropriate non-wasting endowment. The size of the endowment will be commensurate with the level of monitoring required for the conservation lands and estimated adaptive management activities.
- Conservation Lands will be managed for endangered species from start of the project (i.e., mitigation precedes impact).
- One year prior to the development of a new phase, Solargen will establish a Conservation Easement on 2,200 acres on the mitigation lands until such time as all 11,000 acres are protected.
- Solargen will provide a sufficient financial guarantee based on land cost, enhancement/restoration cost, management cost, etc. for all Conservation Land.

Providing enhancements will improve habitat quality for target species and therefore presumably increase carrying capacity. In addition, connectivity analysis will provide not only metrics as to the suitability of these lands in promoting regional connectivity between subpopulations, but will also provide a framework for other agencies to work toward accomplishing recovery goals beyond this project. For this plan, these lands will be managed consistent with conservation goals. The mitigation lands are a diverse and rich landscape that assist in the recovery of the covered species.

The standard for fully mitigated will be achieved by

1. discouraging and preventing permitted land use changes
2. decreasing and preventing through traffic
3. decreasing and preventing erosion caused by roads
4. preventing unauthorized access to area and providing signage informing people that they are trespassing in a protected area
5. removing trash and other debris not natural to the landscape (broken fencing, old signage, barbed wire, etc.)
6. restoring degraded areas (eroded, devegetated, disturbed) by implementing measures to prevent further erosion and revegetation with locally native plants
7. maintaining connectivity between subpopulations for target species
8. increasing the acreage of contiguous parcels of protected lands thereby decreasing edge effect

9. site specific management plans that exploit opportunities for enhancement (primarily revegetation, vegetation enhancement, grazing, removal of invasives if diminishing habitat value for target species)
10. employing species-specific enhancements

Finally, a potential long-term problem that faces covered species in this region (particularly terrestrial vertebrates) is fragmentation and the resulting effective isolation from other subpopulations. Therefore, preserving 11,000 acres of lands that support the covered species as well as other important species and promotes regional connectivity between and among populations could contribute significantly to maintaining viability for these species for the long term recovery..

Connectivity Analysis: The maintenance of habitats and connective pathways for wildlife species sensitive to human-caused landscape change is one of the most pressing issues in conservation biology. For this reason, Solargen will provide a thorough connecvitity analysis to demonstrate that these compensation lands, not only provide suitable habitat attributes for the covered species, but also provides regional connectivity for the relevant species. Appendix C provides a more detailed discussion of the methodologies to be integrated into this conservation plan.

Monitoring: We will employ the multi-season occupancy sampling to generate estimates as to change for covered species on the mitigation lands. The sampling design and effort will be based on findings on the current occupancy sampling effort that is just getting underway for the project site.

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Appendix A. Distance Sampling for the Project Site and Mitigation Lands

Methods: Distance sampling along line transects was conducted to sample burrow clusters, target species and their sign, and suitable habitat. Hand-held GPS units were used to navigate along the transects and record location data. Transect easting coordinates were determined prior to fieldwork. One or two individuals walked along each transect scanning primarily within 50 m of the transect for burrows and then out to the horizon for other target resources (target species, habitat and other wildlife). When two individuals walked together, one was an observer and one was a data recorder to ensure that no animal was counted twice.

Distance sampling methods assume that line transects are located randomly with respect to the distributions of the units of observation, that all objects are detected on the line, no movement prior to detection and accurate measurements of distances to the observations.

Data were collected on burrow clusters and other data continuously along our transects for the first several days of data collection. After February 23, burrow cluster data were collected for 50 m along the transect at 500 m intervals resulting in 2-50 m sections for every 1 km of transect walked. All other target data were collected continuously along the transect.

For the analysis, kangaroo rat burrow clusters were differentiated from giant kangaroo rats by the size of burrows and size of scat. Burrow clusters with larger burrows (3 inches vs 2.5 inches) and the presence of scat of 7mm or longer rather than 5mm in length were considered giant kangaroo rat burrows. In addition, the presence of large hindfoot tracks was also diagnostic, but this was less common due to the fact that it was early spring and the kangaroo rats were less active, and the ground was often compacted due to periodic rainfall.

The software program DISTANCE (v. 5.0; Thomas *et al*., 2005) was used to analyze the data collected from the line transect survey in order to estimate densities of kangaroo rat and giant kangaroo rat burrow clusters. In addition, depending on detection rates, estimates of densities for other target species will be made. Data preparation and analysis followed published guidelines by Buckland *et al*., 2001.

Density estimates of clustered objects (D_s) and individuals (D) were estimated using the equations $\hat{D}_s = \frac{n\hat{f}(0)}{2L}$ and $\hat{D} = \frac{n\hat{f}(0)\hat{E}(s)}{2L}$, respectively (Buckland *et al*., 2001): Where n is the number of objects detected, L is the total length of the line, $\hat{f}(0)$ is the estimated probability detection function of the perpendicular distances evaluated at zero, $\hat{E}(s)$ is the estimated expected cluster size, and $\hat{D}_s$ and $\hat{D}$ is the estimated density of clusters and individuals, respectively (objects km^2).

Final model selection was based on the lowest AIC (Akaike's Information Criterion) value (Burnham & Anderson, 1998). Goodness of fit (χ^2) was used to assess the quality of distance data and the general shape of the detection function. The data were right truncated the width of the maximum sighting distance (w) at least 5% in order to improve model fit.

Results: The burrow cluster data were compiled into two groups: the first group represents the smaller burrows including kangaroo rats, giant kangaroo rats and probable San Joaquin antelope squirrel and the second group, the larger burrows including probable San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows. We analyzed these separately.

Kangaroo rat group: The kangaroo rat burrow cluster data, which included kangaroo rat burrows, probable giant kangaroo rat burrows, and, to a lesser extent, probable San Joaquin antelope squirrel burrows as our targets, were collected in two ways: prior to February 23, we collected burrow cluster data continuously along our transects and after that date, we collected this data in discreet 50 m segments spaced every 450 m. Each of these segments was considered as a separate transect for data analysis.

Our effort resulted in 58.42 km walked in 259 transects. The transects in the Mitigation/Project area spanned both the mitigation and project lands so these were combined this into one category representing a smaller effort (6.4 km in 13 transects).

Table 1: Size of study areas, level of walking effort, number of transects for Distance analysis and number of observations used in this analysis for the kangaroo rat burrow cluster analysis

Study Area	***Area (sq km)***	***Effort (m)***	***No. transects***	***obs***
Entire	63.6	58421	259	456
Project	19.1	19279	60	75
Mitigation	44.5	32709	186	372
Mit/Proj	63.6	6436	13	9

We analyzed the entire study area for all targets combined and then post-stratified by stratum (Mitigation Area, Project Area, Mitigation/Project Area). We tested several models (13) using keys (uniform, half normal, and hazard rate) and adjustments (cosine, simple polynomial and hermite polynomial), different right truncation values, and stratified and non-stratified in DISTANCE, generally relying on the delta AIC values for model selection (lowest delta AIC value). We pooled the probability of detection function [g(0)] for stratified samples to calculate density estimates. For theses analyses, the best model (lowest delta AIC) was the hazard rate (key) plus cosine (adjustment term) with 10% truncation of largest values. In order to estimate resource densities for each stratum, we analyzed each stratum separately post stratifying by burrow cluster type using a pooled g(o) from the respective stratum. We tested 13 models for the Project Area stratum. The best model (the lowest delta AIC) was hazard rate (key) with the cosine adjustment and 5% right truncation of the highest values; the addition of a simple polynomial adjustment did not improve model fitting and the values were the same as the selected model. We tested 11 models for the Mitigation Area. The best model (the lowest delta AIC) was negative exponential (key) with the cosine adjustment with 5% right truncation of the greatest values.

The density estimates for the all targets together (Table 2, Figure 1) show that density in the Mitigation Area is greater than in the Project Area; when these density estimates are broken out by resource type, kangaroo rat densities are higher in the Mitigation Area but the GKR densities are lower (Table 2, Figure 2). When the CI is included, there is a large overlap between the two estimates (see Figure 2). The giant kangaroo rat density estimate may be somewhat misleading for the Mitigation Area due to the fact that although we measured the aerial extent of the burrow cluster and the number of burrows, we did not include in this analysis. Several giant kangaroo rat burrow clusters were very large (> 1 ac) in size and contained many burrows and likely several precincts, therefore artificially lowering the overall "density" measured when just considering this as one unit. We hope to rectify in a later more detailed analysis.

Table 2: Density estimates for all "kangaroo rat" burrow clusters for the entire study area and stratified by each study area, and for burrow cluster type (GKR = giant kangaroo rat, kangaroo rat, and probable San Joaquin antelope squirrel) for each study area (pooled detection function from each stratum).

Study Area	***Target***	***Density (per sq km)***	***%CV***	***df***	***95% CI (lower)***	***95% CI (upper)***
Entire	All (Krat, gkr, prob SJAS)	1168.6	17.22	154.99	833.8	1638.0
Project Area	All (Krat, gkr, prob SJAS)	272.8	49.27	59.93	107.4	693.3
Mitigation	All (Krat, gkr, prob SJAS)	797.7	14.87	220.29	596.0	1067.6
Mit/Project	All (Krat, gkr, prob SJAS)	98.1	86.11	12.06	19.4	496.5
Mitigation	GKR	86.7	41.65	191	39.4	190.7
Mitigation	kangaroo rat	990.7	15.46	234	731.9	1340.9
Mitigation	probable sjas	14.4	27.69	198.89	8.5	24.7
Project	GKR	144.7	79.50	76.79	35.9	583.3
Project	kangaroo rat	129.7	56.21	99.94	45.9	366.7

Figure 1: Density estimates for all target species (*D*±SE) in the Mitigation and Project Area

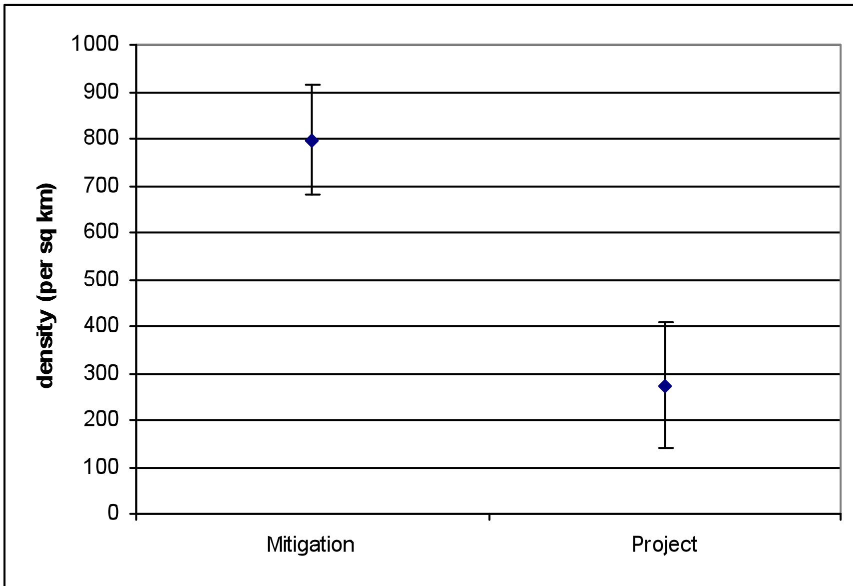
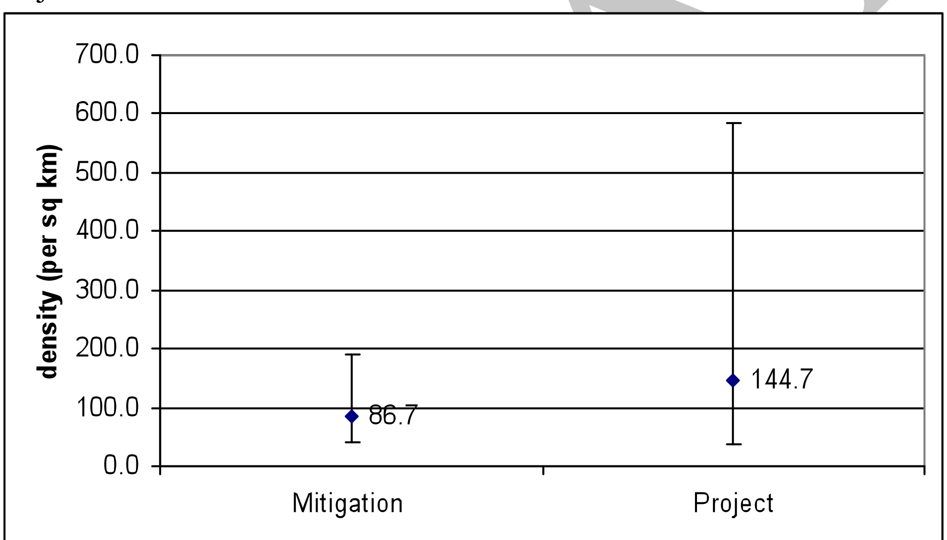


Figure 2: Giant kangaroo rat density estimates (with upper and lower CI) for the Mitigation and Project Areas.



Larger burrows: potential San Joaquin kit fox dens, badger dens, and burrowing owl burrows

We collected carnivore den, potential San Joaquin kit fox den, badger den and burrowing owl burrow location data continuously along our transects. Our total effort resulted in 162.3 km in 60 transects of effort for this analysis. We included the Mitigation/Project Area in two cases where transects were equally distributed in both the Mitigation and Project Area.

Table 3: Size of study areas, level of walking effort, number of transects, and number of observations used for this Distance analysis for potential San Joaquin kit fox den, badger dens, other carnivore dens, and burrowing owl burrows

Study Area	*Area (sq km)*	*Effort (m)*	*No. trans*	*obs*
Entire	63.6	162294	60	163
Project	19.1	40169	17	53
Mitigation	44.5	110737	43	94
Mit/Proj	63.6	11388	2	16

We analyzed the entire study area for all the data combined and then post-stratified by stratum (Mitigation Area, Project Area, Mitigation/Project Area). We tested several models (14) using keys (uniform, half normal, and hazard rate) and adjustments (cosine, simple polynomial and hermite polynomial) with different right truncation values, and stratified and non-stratified in DISTANCE, generally relying on the delta AIC values for model selection (lowest delta AIC value). We pooled the probability of detection function [g(0)] from the entire effort to calculate density estimates for stratified samples. For theses analyses, the best model (lowest delta AIC) was the uniform (key) plus cosine (adjustment term) with 10% right truncation of largest values.

We detected burrowing owl burrows (n = 12), badger dens (n = 12), potential San Joaquin kit fox dens (n = 130), generic carnivore dens (n = 10), coyote dens (n = 8) and a red fox den (red fox observed). San Joaquin kit fox presumably would use most of these structures for shelter and denning with the exception of the larger coyote dens.

The density estimate for the Project Area is greater than the Mitigation Area with overlapping confidence intervals (CI) (Table 4, Fig. 3); standard error bars show some separation of the estimates but the error bars overlap (Fig. 4). I am not at all sure why the density estimate for the Entire study area is so much higher than the other three estimates. The few number of transects walked for the Mitigation/Project Area (n = 2) contributed to the very large CI for this estimate; it is only included here to show why the Entire study area estimate is greater than the other estimates.

Table 4: Density estimates for target resources (potential San Joaquin kit fox den, badger dens, other carnivore dens, and burrowing owl burrows) for the entire study area stratified by each study area. (D = density)

Study Area	Target	D (per sq km)	%CV	df	95% CI (lower)	95% CI (upper)
Entire	Carnivore dens and burrowing owls burrows	131.9	19.89	4.29	77.5	224.7
Project Area	Carnivore dens and burrowing owls burrows	48.7	26.48	22.01	28.4	83.6
Mitigation	Carnivore dens and burrowing owls burrows	31.3	21.50	65.33	20.5	47.9
Mit/Project	Carnivore dens and burrowing owls burrows	51.9	36.48	1.18	2.2	1234.1

Figure 3: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI (see Table 3 above) for each study area.

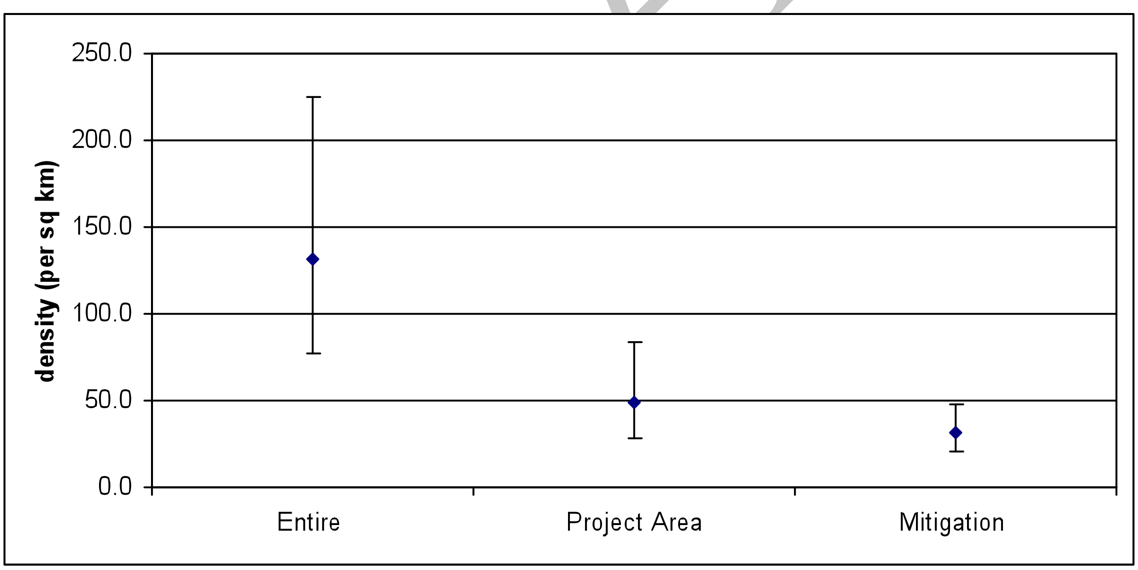


Figure 4: Density estimates (potential San Joaquin kit fox dens, badger dens, other carnivore dens, and burrowing owl burrows) with upper and lower CI (see Table 3 above) for the Mitigation and the Project Area.

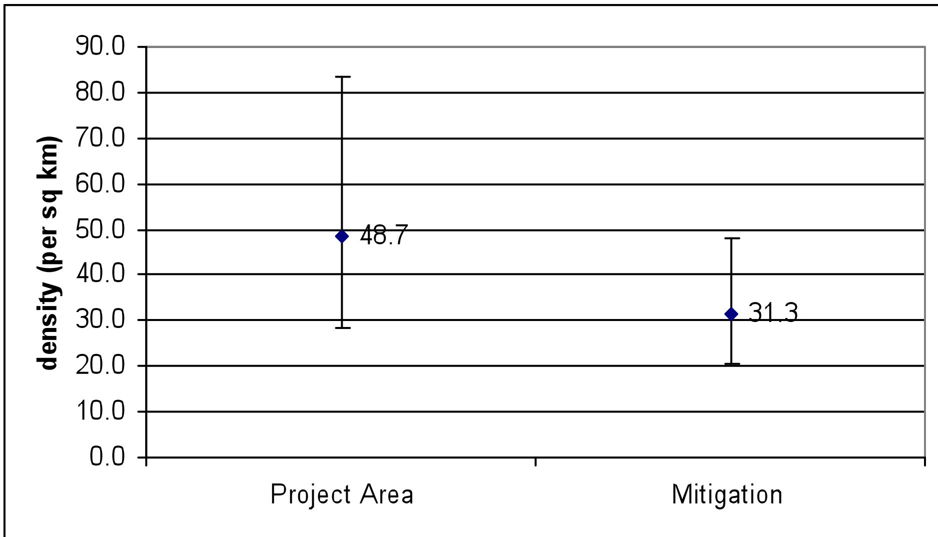
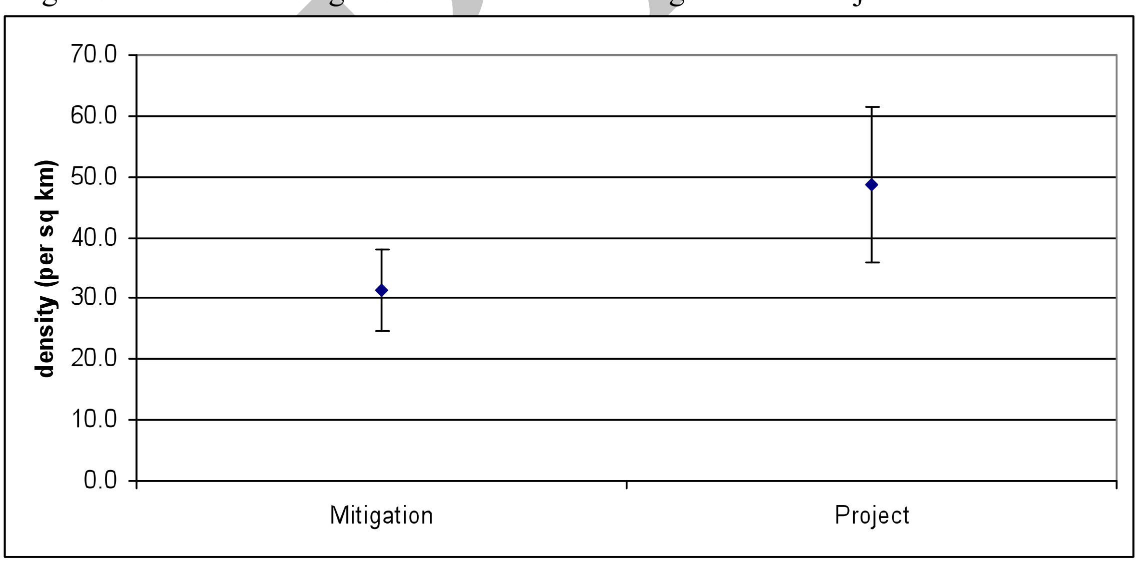


Figure 5: Density estimates (D±SE) for potential San Joaquin kit fox dens, other carnivore dens, badger dens and burrowing owl burrows for the Mitigation and Project Areas



APPENDIX B: Best Management Practices

All employees and contractors will be made aware of the BMPs, and those BMPs that are pertinent to employee work conduct will be implemented. They are listed below.

a) Prior to surface disturbance or other covered activity, a qualified wildlife biologist shall conduct a Covered Species education program (tailgate briefing) for all project personnel. Topics to be discussed during the briefing shall include: occurrence and distribution of Covered Species in the project area, take avoidance measures being implemented during the project, reporting requirements if incidental take occurs, and applicable definitions and prohibitions under the California Endangered Species Act.

b) All activities that will result in permanent or temporary ground disturbances shall be preceded by a preconstruction survey conducted by a qualified biologist. The biologist(s) shall identify and clearly mark the location of areas where Covered Species was/were identified, dens or burrows and habitats of Covered Species that are to be avoided Appropriate buffers will be established with highly visible markers. When burrows or dens are to be destroyed, a qualified biologists will determine when excavation procedures should be employed to protect individual covered species and when it is not necessary.

c) For some projects, a qualified biologist may determine that [a] biological monitor(s) shall be present while ground disturbing activities are occurring based on the sensitivity of the habitat in which a project occurs. In addition to conducting preconstruction surveys for the project, the biological monitors shall aid crews in satisfying take avoidance criteria and implementing project mitigation measures, will document all pertinent information concerning project effects on Covered Species, and shall assist in minimizing the adverse effects of project activities on Covered Species. Biological monitors shall accompany vehicles and crews throughout the project area if the qualifying biologist considers it necessary in order to avoid sensitive resources.

d) Biological monitors are empowered to order cessation of activities if take avoidance and/or mitigation measures are violated and will notify Solargen's environmental representative.

e) Unless otherwise allowed under preconstruction procedures (see discussion of b above), all known and potential San Joaquin kit fox dens, known or detected giant kangaroo rat burrows, known or detected San Joaquin antelope squirrel burrows, burrows inhabited by blunt-nosed leopard lizards, blunt-nosed leopard lizard habitat, burrowing owls burrows, shall be protected by implementing the following procedures:

The following table lists avoidance criteria for listed wildlife resources and conditions are as follows:

AVOIDANCE CRITERIA	
Type of Sensitive Area	**Radius of Buffer Zone in Feet**
Occupied kit fox den	100
Known kit fox den	100
Known kit fox natal den	150

Occupied kit fox natal den	200
Potential kit fox den	50
Giant kangaroo rat burrows (active and inactive)	50
San Joaquin antelope squirrel burrows	50
Occupied blunt-nosed leopard lizard burrows	50
Rodent burrow in wash (blunt-nosed leopard lizard habitat)	30
Burrowing owl burrows (breeding season)	250
Burrowing owl burrow (non-breeding season)	150

f) Unless biological monitors allow alterations to routes, all project vehicles shall be confined to existing roads or prominently staked and/or flagged access routes that are surveyed prior to use. All observed Covered Species and their habitat features such as dens, burrows or specific habitats shall be flagged as necessary to alert project personnel to their presence. All project-related flagging shall be collected and removed after completion of the project.

g) Where feasible, Solargen shall make every reasonable effort to avoid the collapse of dens and burrows where practicable by relocating project elements or by using other means as determined to be appropriate. When these features cannot be avoided, a qualified biologist will oversee the excavation and/or collapse of burrows or dens.

h) Biological monitors shall keep an accurate tally of the number of sensitive resources (as listed above) that are damaged, destroyed, or otherwise affected by project activities. Additionally, monitors shall estimate the number of small mammal burrows damaged, destroyed, or otherwise affected. Total number of dens and burrows affected by the project shall be reported in the post-activity compliance report and entered into a central database developed expressly for that purpose.

i) Potential kit fox dens that cannot be avoided may be excavated and back-filled pursuant to USFWS guidelines (June 1999) without prior notification, provided that excavation is approved and supervised by a biological monitor or other qualified biologist. Destruction of all kit fox dens shall be reported in the post-activity compliance report.

j) Solargen shall appoint an company representative who will be the contact source for any employee or contractor who inadvertently kills or injures a Covered Species or who finds a dead, injured, or entrapped individual or who finds a dead, injured or entrapped covered animal species. The representative will be identified during the pre-performance educational briefing.

k) Any contractor, employee(s), or other personnel who inadvertently kills or injures a covered animal species shall immediately report the incident to their representative. The representative shall contact the Solargen's environmental representative and, if feasible, a qualified biologist. Solargen will contact CDFG immediately in the case of a dead, injured, or entrapped listed species. The covered Species CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The qualified biologist will also document all circumstances of death, injury or entrapment of

Covered Species. The biologist will 1) take all reasonable steps to enable the individual animal to escape should it be entrapped, 2) contact CDFG or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured, and 3) document circumstances of death in writing and if possible photographing dead animal *in situ* prior to moving.

l) USFWS and CDFG shall be notified in writing within three (3) working days in the event of an accidental death or injury of a San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, or San Joaquin antelope squirrel or of the finding of any dead or injured kit fox, giant kangaroo rat, blunt-nosed leopard lizard, San Joaquin antelope squirrel for other Covered Species. Notification shall include the date, time, and location of the incident or of the finding of a dead or injured animal, and any other pertinent information. The USFWS contact for this information is the Endangered Species, Program Field Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825, (916) 414-6600. The CDFG contact information is 1416 9th Street, Sacramento, CA 95814, and (916) 654-4262. Any dead or injured kit fox, giant kangaroo rat, blunt-nosed leopard lizard, or San Joaquin antelope squirrel shall be turned over to the California Department of Fish and Game's Environmental Services Division, Fresno Regional Headquarters at (209) 445-6152 at the agency's request. The dead covered animal can be transported to California State University at Bakersfield or the Endangered Species Recovery Team in Bakersfield for storage and research if CDFG approves.

m) To prevent inadvertent entrapment of Covered Species, all open holes, steep-walled holes, or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks (wooden planks should be more no less than 10 inches in width and should reach to bottom of trench). Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals.

n) All spills of hazardous materials shall be cleaned up immediately in accordance with the Solargen Spill Prevention Control Plan.

o) Pets are prohibited at the PVSF.

p) Firearms are prohibited at the PVSF.

q) All food-related trash, such as wrappers, cans, bottles, bags, and food scraps shall be disposed of daily in containers with secure covers and regularly removed from project sites.

r) Use of rodenticides and herbicides in project areas is prohibited with the exception of those applied near buildings/critical facilities. Only agency approved compounds will be applied (if necessary) by licensed applicators in accordance with label directions and other restrictions mandated by U.S. Environmental Protection Agency, County Agricultural Commissioner, regional label prescriptions on use, California Department of Food and Agriculture, and other State and Federal legislation.

s) All project-related vehicles shall observe a speed limit of 25 mph or less on all except as posted on State and County highway/roads or paved facility roads.

t) Motorized vehicles are prohibited within occupied Covered Species habitat. If not avoidable, that area will be considered temporarily disturbed and size will be limited in width to 25 feet (12.5 feet on either side of the centerline).

u) Appropriate measures shall be undertaken to prevent unauthorized vehicle entry to off-road survey routes in sensitive habitat areas. Signing will be the preferred method to discourage use.

v) Project vehicles shall be confined to existing primary or secondary roads or to specifically delineated project sites (i.e., areas that have been surveyed and described in existing documentation). Otherwise, off-road vehicle travel is not permitted.

w) Upon completion of any project, all areas that are significantly disturbed and not necessary for future operations, shall be stabilized to resist erosion, and revegetated and re-contoured if necessary, to promote restoration of the area to pre-project conditions.

Employee Education Program

The Employee Education Program familiarizes Solargen employees and contractors with BMPs and other measures regarding Covered Species. This program is designed to ensure all personnel who work at the PVSF are aware of and can identify the Covered Species and the measures implemented to protect these species. In addition, contact names and numbers are given to which personnel can report incidents regarding Covered Species.

An employee environmental program (awareness) will be administered to all new employees and to all other employees every 2 years. Upon completion of the program, the employees are given a badge that is required for admittance onto the PVSF. Badges will include the employee's picture and will be color-coded and dated in order to show that the employee is current with required training.

Prior to beginning work at the PVSF, all new employees, contractors, and other personnel that work at the PVSF and associated right-of-ways will complete an employee education program that includes a section on Covered Species awareness. Personnel must take the Employee Education Program administered test. Training included in the Employee Education Program pertains to Covered Species' identification, Covered Species' basic natural history, components of avoidance and minimization program, familiarity with preconstruction surveys and what they are and how they are administered, BMPs, and how to report incidents involving Covered Species.

The employee or contractor for PVSF will be shown examples (i.e., pictures) of Covered Species and their burrows, dens, nests or other sign. Basic natural history facts for each of the Covered Species will be included in information given to employees. All BMPs will be provided in easy to carry pamphlets for reference while working at the PVSF and lands within the 2-mile buffer.

A review of the BMPs will be conducted for each employee and a test will be administered to verify that employees have a familiarity with the provisions in the BMPs.

Appendix C. Connectivity Analysis

The fate of wide-ranging species depends critically on planning efforts that simultaneously consider the habitat requirements and ecological processes that motivate animal movement over long distances. However, planners require more specific information on the features of wildlife habitat that promote or impede the linkage and maintenance of population core areas on large landscapes, including vegetation, topography, and anthropogenic barriers.
The space use needs of large mammals are rarely considered at spatial scales relevant to the species. Often these efforts are based on legal and not bioregional boundaries and, as such, cannot easily accommodate the conservation of wildlife habitats that extend beyond the legal boundaries of sites or planning efforts. In addition, simplistic attempts to identify "movement corridors," usually focus on delineating "corridors," which can best be defined as "routes that facilitate movement of organisms between habitat fragments" (Hilty et al. 2006:5). Corridor delineation efforts, however, typically invoke simplistic judgment-based exercises describing static habitat patterns, and do not explicitly integrate the ecological *processes* of animal movement (e.g., dispersal). Moreover, corridor studies tend to occur at relatively small spatial scales and emphasize one (or few) possible pathways between patches of habitat presumed to be suitable. For example, some rely on the non-statistical least cost path (LCP) or least cost corridor (LCC) method to identify "wildlife corridors," as it is widely available as a free extension to ArcGIS and relatively simple to run. The challenge is that due to the unrealistic assumptions (e.g., animals have perfect knowledge of their landscape) and overly simplistic results of a single "optimal" corridor, conservation efforts for rare or sensitive species are more likely compromised than benefited.

Some have tried to circumvent the inherent problems with LCP by a tortuous process of rerunning the model with different end points to define multiple pathways. However, all that this accomplishes is to compound the intrinsic flaws of the LCP model, and unfortunately for the untrained eye, provides a "reasonable" facsimile of how species move between and among suitable habitat patches. Sadly, this approach merely legitimizes a non-statistical and highly flawed modeling methodology and its resultant "solution." This is why landscape ecologists have argued that complex connectivity measures that not only take into account the movement abilities of the species, but also the distances to all possible population sources, perform better at defining the connectedness of a landscape (Moilanen and Nieminen 2002, Lindenmayer and Fischer 2006). While it is desirable to strive for parsimony (e.g., Ockham's Razor) in deriving spatial models, it is a fallacy to believe that overly simplistic models are parsimonious – it is a bit counter-intuitive, but complex models that do a better job of approximating reality are in fact more parsimonious than simple models that are based on seriously flawed assumptions (e.g., LCP). For example, it is a tautology (i.e., circular) to run a LCP analysis several times trying to identify multiple pathways as the artificial placement of end points "pre-determines" the pathway. Thus it is a fallacy to believe the multiple LCP runs accomplish the type of analyses that Moilanen and Nieminen (2002) were advocating.

Indeed, when recommended mitigation areas are improperly identified there can be great risk to both animals and resource investments. In this context, landscape-level approaches and predictive, probabilistic models that are rigorously derived and ecologically meaningful are needed.

San Joaquin Kit Fox: The movements of wide-ranging animals, such as the kit fox, are most influenced by the dominant attributes of the habitat mosaic to be navigated, namely vegetation. At the moment, we propose to rely on currently available spatial data on vegetation communities in California which have been derived at a 30-100-m resolution using satellite imagery acquired during the previous decade (e.g., CALVEG, Landfire). We will use USGS digital elevation models (DEMs; 10m) to derive multiple terrain features, including topographic position and landscape ruggedness. Each of these data layers will be subjected to a formal process of expert and literature review in order to vet, classify, and weight each layer (i.e., "variable") entering into the habitat and connectivity models described below. Typically, 6 to 8 variables are selected and integrated into these analyses. All data layers and models will be derived using cutting-edge remote sensing and geographic information system applications where appropriate.

As we did for the cougar model in Southern California, the vegetation cover map will not simply be a ranking of various cover classes but the ensuing vegetation map will incorporate patch metrics. In other words, the subsequent value of a pixel will be integrated into the neighborhood by which it is surrounded. This considers the fact that the adjacent land cover types influence the importance of a habitat type for a target species. For example, riparian habitat within a mosaic of oak woodland and chaparral habitats is of higher value for a cougar than riparian habitat contained entirely within an urban matrix. In other words, context is important.

We will develop an expert-based model of habitat suitability for San Joaquin kit fox using the relevant habitat data layers and relying on the ranking of 4 or 5 experts. On a continuous scale of 0–1000, each expert will score the relative likelihood of each habitat attribute, or "class" (at the scale of the 30-m grid cell) to "support or sustain the day-to-day behaviors of an individual kit fox within an established home range." Scored values of 1000 indicate "most likely" and values of 0 indicate "not capable." We will use a quantile classification method to initially divide the distribution of cell values for the certain data layers such as topographic position, roads, developments layers into 10 suitability classes (score = 100, 200, 300, …, 1000, where 100 was lowest and 1000 was highest).

We will use a modification to the GIS-based Weighted Linear Combination (WLC) procedure described by Malczewski (2000) to average habitat class score values and to weight and combine individual habitat data layers. We will compute an average expert-defined habitat class score value and create a new layer that assigns this value to each cell in that habitat class. Separately, individual experts will be requested to assign an importance value (on a continuous scale of 0–1000) to each of the habitat layers and will compute a "swing weight" (sensu Malczewski 2000) for each layer by dividing its importance value by the sum among all importance values. Briefly, swing weights are derived by asking an expert to compare a change, or swing, from the least- to most-suitable habitat class value for a given habitat layer to a similar change in another habitat layer, and scoring the importance of all layers accordingly. Next we will create a preliminary habitat suitability layer by calculating the average importance value from among all experts, computing a new swing weight for each layer, and then multiplying this value by the average expert-defined habitat class score value at each cell. We will then add the products for each of the final layers together. Finally, we will reclassify these new values using a GIS algorithm that identifies four quartile breaks in the data distribution, where the 75^{th} percentile represents the highest suitability areas. We will use this more parsimonious classification (1=low suitability and 4=high suitability) as our final habitat suitability layer.

To characterize potential large core habitat areas on the study area, we will use a circular moving window and focal-majority operation in the GIS to identify contiguous areas with the highest habitat suitability values that are within a suitable radius (i.e., radius will be based on average home range size for the region) of each 30-m cell on the study area. Importantly, we will consider core habitat areas to be large patches of contiguous high suitability habitat, typically nested within broader suitable areas on the landscape, and that are capable of supporting the minimum prey and cover requirements for source and destination populations of dispersing kit fox.

A key ecological principle is that on large landscapes with suitable and well-connected habitat features, greater numbers of low resistance pathways will permit greater current (or energy) flow between pairs of nodes. That is, greater connectivity among populations or core patches is predicted when more connected pathways are available. Because they have a solid mathematical foundation in random walk theory and probabilistically incorporate all possible pathways linking habitat features, circuit-theoretic models convey greater realism than more common analytical approaches, such as least-cost path analysis (see McRae et al. 2008).

We will use a similar approach for identifying regional connectivity issues for GKR

McCORMICK
BIOLOGICAL, INC.
Biological Sciences – Inventory, Permitting, and Planning

MEMORANDUM

Date: **March 13, 2015**

To: Jennifer Kaminsky

Of: Burns and McDonnell Engineering Company, Inc.

From: Randi McCormick, Principal Biologist

Subject: Early season rare plant surveys of Panoche Solar Project Footprint

Purpose

The purpose of this memorandum is to briefly document an early season rare plant survey conducted by McCormick Biological, Inc. on the Panoche Solar Project Footprint (approximately 2,506 acres) plus a buffer of at least 100 feet located in San Benito County, California (Attachment 1). In addition, eight wire pull sites, three guard structure sites, four temporary work areas, All Dielectric Self-Supporting (ADSS) pole sites and one helicopter landing zone were surveyed. These areas are located within natural lands that represent potential habitat for rare plant taxa along the proposed telecommunications routes for the Panoche Valley Solar Project (Project) within Pacific Gas &Electric (PG&E) right-of-way in San Benito and Fresno Counties. These surveys were conducted in compliance with MM BR-3.1 of the draft Supplemental Environmental Impact Report for the Revised Project.

Survey

Survey methods were consistent with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2009) (Protocols). Each of the Project components was surveyed by qualified botanists using walking transects spaced no more than 20 meters apart. Special attention was given to areas of unusual soils and high species diversity. Reference sites that were located within approximately ten miles of the Project Footprint were surveyed for three early season rare plant species, San Joaquin wooly threads (*Monolopia congdonii*), forked fiddleneck (*Amisinckia furcata*), and Panoche peppergrass (*Lepidium jaredii* ssp. *album*), to verify survey timing. All three of these taxa were verified to be in a flowering and fruiting stage that enabled positive identification. Reference sites for all potentially occurring rare plant species were not visited; however, these three species were considered suitable proxies for verification of appropriate timing for potentially occurring early flowering plant species. Several of the target rare plant species are expected to flower later in the season. GPS points were taken to enable follow-up surveys for the plants in these genera that could not be identified during the survey

All plant taxa encountered were identified to the extent possible. Identifications were made using keys contained in The Jepson Manual: Vascular Plants of California (2nd Edition) (2012) and updates found in the Jepson eflora (http://ucjeps.berkeley.edu/IJM.html), containing revisions to taxonomic treatments. Plant identifications were made using a 10x or greater magnification field hand lens and/or were collected and identified using a dissecting microscope.

When encountered, observations of special-status plant species were documented as follows: coordinates were recorded using a handheld global positioning unit, number of plants in the population was counted (<50 individuals) or estimated (>50 individuals), percent of population flowering, vegetative, and/or in fruit was estimated. If enough individuals were present, a voucher specimen was collected following standard botanical collecting guidelines.

The survey was conducted between March 3 and March 13, 2015. Between five and seven surveyors walked parallel transects on the Project Footprint and the 100 foot buffer. Each of the PG&E telecommunications elements was inventoried by one to two surveyors. The target list of rare plants was compiled in the Panoche Valley Solar Project Final EIR, and is shown in Table 1 below:

Table 1: Target List of Rare Plant Species

Species	**Status**	**Flowering Period**	**Comments**
Amsinckia furcata Forked fiddleneck	CRPR 4.2	March-May	
Androsace elongata ssp. *acuta* California androsace	CRPR 4.2	February-April	
Antirrhinum ovatum Oval-leaved snapdragon	CRPR 4.2	May-July	
Astragalus macrodon Salinas milk vetch	CRPR 4.3	April-June	
Astragalus rattanii var. *jepsonianus* Jepson's milk vetch	CRPR 1B.2	April-June	
Atriplex cordulata var. *cordulata* Heartscale	CRPR 1B.2	June-July	
Atriplex coronata var. *coronata* Crownscale	CRPR 4.2	March-October	
Atriplex coronata var. *vallicola* Lost Hills crownscale	CRPR 1B.2	April-September	
Atriplex depressa Brittlescale	CRPR 1B.2	June-October	
Atriplex joaquiniana San Joaquin spearscale	CRPR 1B.2	April-September	
Atriplex minuscula Lesser saltscale	CRPR 1B.1	April-October	
Atriplex subtilis Deltoid bract saltbush	CRPR 1B.2	June-October	
Blepharizonia plumosa Big tarplant	CRPR 1B.1	July-November	
California macrophylla Round leaved filaree	CRPR 1B.1	March-July	

Camissonia benitensis San Benito evening primrose	FT, CRPR 1B.1	April-June	
Campanula exigua Chaparral harebell	CRPR 1B.2	May-June	
Caulanthus californicus California jewelflower	FE, SE, CRPR 1B.1	February-April	
Caulanthus lemmonii Lemmon's wild cabbage	CRPR 1B.2	March-May	
Chorizanthe ventricosa Priest Valley spineflower	CRPR 4.3	May-September	
Chlorophyron molle ssp. *hispidum* Hispid bird's beak	CRPR 1B.1	June-September	
Deinandra halliana Hall's tarplant	CRPR 1B.1	April-May	
Delphinium californicum ssp. *interius* California larkspur	CRPR 1B.2	April-June	
Delphinium gypsophilum ssp. *gypsophilum* Pinoche Creek larkspur		March-June	
Delphinium recurvatum Recurved larkspur	CRPR 1B.2	March-June	
Eriastrum hooveri Hoover's eriastrum	CRPR 4.2	March-July	
Eriogonum gossypinum Cottony buckwheat	CRPR 4.2	March-September	
Eriogonum nudum var. *indictum* Naked buckwheat	CRPR 4.2	April-December	
Eriogonum temblorense Temblor buckwheat	CRPR 1B.2	April-September	
Eriogonum vestitum Idria buckwheat	CRPR 4.3	April-August	
Fritillaria falcata Talus fritillary	CRPR 1B.2	March-May	
Fritillaria viridea San Benito fritillary	CRPR 1B.2	March-May	
Lagophylla diabolensis Diablo Range hare leaf	CRPR 1B.2	April-September	
Layia discoidea Rayless layia	CRPR 1B.1	May	
Layia heterotricha Pale yellow layia	CRPR 1B.1	March-June	
Layia munzii Munz's tidy tips	CRPR 1B.2	March-April	
Lepidium jaredii ssp. *album* Panoche pepper grass	CRPR 1B.2	February-June	
Leptosiphon ambiguus Serpentine leptosiphon	CRPR 4.2	March-June	

Madia radiata Golden madia	CRPR 1B.1	March-May	
Malacothamnus aboriginum Gray bushmallow	CRPR 1B.2	April-October	
Monolopia congdonii San Joaquin woollythreads	FE, CRPR 1B.2	February-May	
Navarretia nigelliformis ssp. *radians* Adobe navarretia	CRPR 1B.2	April-July	
Navarretia prostrata Prostrate navarretia	CRPR 1B.2	April-July	
Phacelia phacelioides Mt. Diablo phacelia	CRPR 1B.2	April-May	
Senecio aphanactis California groundsel	CRPR 2B.2	January-April	
Streptanthus insignis ssp. *lyonii* Arburua Ranch jewelflower	CRPR 1B.2	March-May	

FE = Federally Endangered SE = State Endangered

CRPR = California Plant Rank (California Native Plant Society)
1B = Plants that are rare, threatened, or endangered in California and elsewhere
4 = A watch list; plants of limited distribution
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3: Not very endangered in California

Findings

No federal or state listed rare, threatened or endangered plant species were observed within the survey area during this early season survey. Several plant species ranked by the California Native Plant Society were observed (See Table 1 and Figure 1). Relatively small populations of forked fiddleneck, serpentine leptosiphon, and California groundsel were found within the Project Footprint. In the region, forked fiddleneck is found at several locations numbering in the thousands, while relatively large populations of serpentine leptosiphon (10,000+) and California groundsel (50+) were found outside of the Project Footprint during the survey. The locations of these observations are shown on Figure 1 attached.

Impacts to a small portion of a population (i.e., a few individuals) of plants that are not federally or state-listed, or impacts to a population for which loss of a local population would not substantially affect the range of the species have been considered in the 2010 Final EIR and 2014 Supplement EIR, Section C.6.

Impacts to these species would be reduced through implementation of Mitigation Measures BR-G.1 through BR-G.6 which states, (1) All construction personnel participate in the Worker Environmental Education Program; (2) Best Management Practices (BMPs) for biological resources are implemented; (3) A Habitat Restoration and Revegetation Plan is developed and implemented; (4) Biological construction monitoring is implemented; (5) Conservation easements are created for permanent habitat protection as appropriate; and (6) A Habitat Mitigation and Monitoring Plan is developed and implemented for mitigation lands. MM BR-1.1 would ensure the preparation and implementation of a Weed Control Plan and MM BR-1.2 would ensure the

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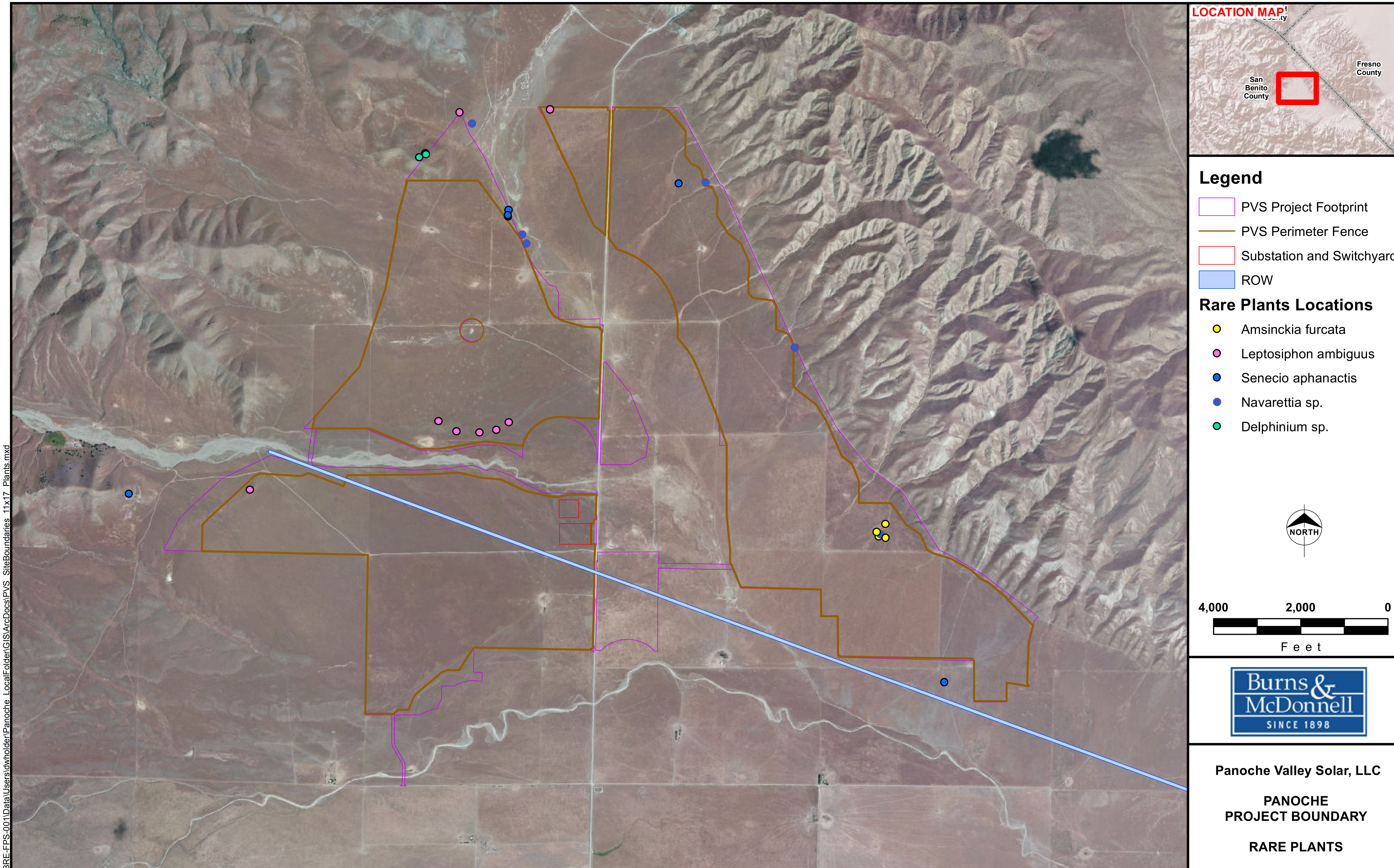
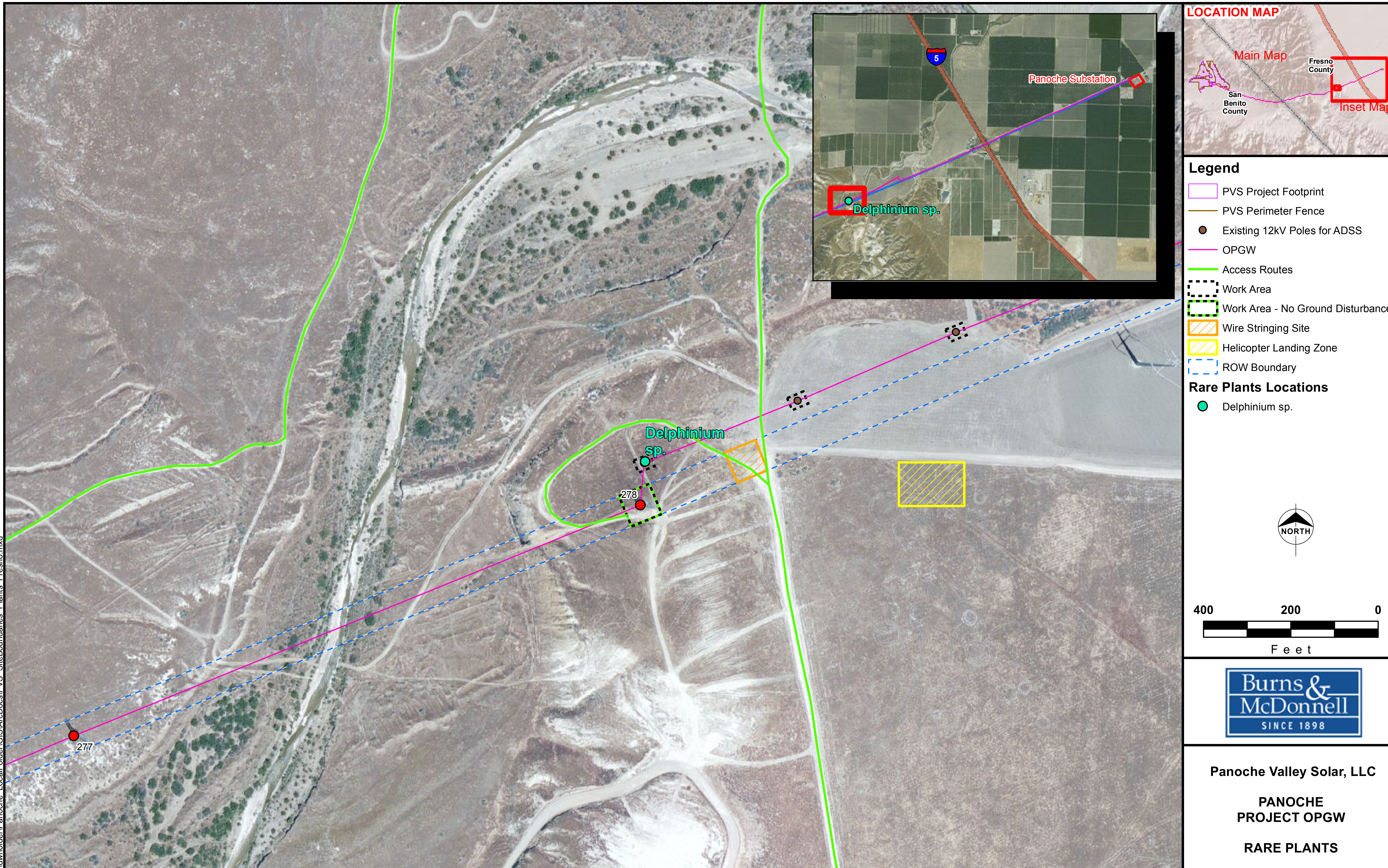
development of a Grazing Plan for vegetation management on the site. In addition, MM AQ-1.1 would reduce impacts from fugitive dust. Finally, MM BR-3.1 would require pre-construction surveys for special-status plant species. These measures would reduce impacts to these CNPS-listed plants. A results survey report will be prepared that includes a list of all plant taxa identified during the survey and recommendations regarding follow-up surveys to fulfill the methods for comprehensive floristic surveys as described in the CDFW Protocols.

Participating Botanists

The following individuals assisted in the early season rare plant surveys for the Panoche Valley Solar Project: Marcus Jones, Ed Kentner, Russell Kokx, Eve Laeger, Randi McCormick, Gene Moise, Keir Morse, and Jordan Zylstra.



Panoche Valley Solar Project Boundary, 1:24,000, DWHolder, 1/9/2015



Legend

- PVS Project Footprint
- PVS Perimeter Fence
- Existing 12kV Poles for ADSS
- OPGW
- Access Routes
- Work Area
- Work Area - No Ground Disturbance
- Wire Stringing Site
- Helicopter Landing Zone
- ROW Boundary

Rare Plants Locations

- Delphinium sp.

Burns & McDonnell SINCE 1898

Panoche Valley Solar, LLC

PANOCHE PROJECT OPGW

RARE PLANTS

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Panoche Valley Solar Project Boundary, 1:2,400 DWHolder, 3/24/2015